CLARA E. SPEIGHT-HUMBERSTON'

QH
581
.H91

The
Origin of the Chemical Elements and of Cell Life

BY

CLARA E. SPEIGHT-HUMBERSTON

WITH ILLUSTRATIVE PLATES

ACTON, ONTARIO
PRINTED BY THE ACTON FREE PRESS

THE UNIVERSITY OF ALBERTA

Copyright, 1914, by
CLARA E. SPEIGHT-HUMBERSTON'

UNIVERSITY LIBRARY
THE UNIVERSITY OF ALBERTA

PREFACE

Hugo De Vries, Professor of Botany in the University of Amsterdam, says in his work, "Species and Varieties—Their Origin by Mutation," "The probabilities are now greatly in favour of our finding out the causes of evolution by a close scrutiny of what really occurs in nature. A persistent study of the physiological factors of this evolution is the chief condition of success. To this study, field observations may contribute, as well as direct experiments, microscopical investigations, as well as extended pedigree-cultures.

"The co-operation of many workers is required to cover the field. Somewhere, no doubt, the desired principle lies hidden, but until it is discovered all methods must be tried. A very slight indication may change forever the whole aspect of the problem."

It was through "field observations" that the writer's interest in scientific research was first awakened.

Having undertaken the preparation of material for the furtherance of Nature Study in the schools of Canada, such as "Birds of Canada, in Relation to Agriculture" (published 1908), "The Wild Animals of Canada," "The Wild Flowers of Canada," and "The Fishes of our Canadian Waters," at the request of the Minister of Education of the Provincial Government, in the form of Pictorial Charts, a very careful study of the classification of the different forms of life was necessary.

The evidence of fixed numbers and their multiples in determining [illegible] on and subdivision of the different forms of life, forced [illegible] usion that only by regarding science indivisible in all its b[illegible] can its great truths be rendered discoverable.

[illegible] wonderful achievements of specialization had been kept too [illegible] ate. The new knowledge of matter afforded by electro-chemical analysis, and by experiments with substances of the radium group, proved that the same kind of rays were being emitted by all forms of matter.

The electrical constitution of matter appeared to hold the key to the solution of the laws that governed the grouping of material forms, in fixed numbers and multiples of those numbers.

The present conception of Evolution places the origin of life as "spontaneous" and in sterilized waters (condensing on a molten mass), a condition which is to-day declared impossible.

The electrical constitution of matter forces the recognition that *motion* is *life,* and the control of motion determines the length of time the material form shall *live.*

THE UNIVERSITY OF ALBERTA

12500

The declaration that life originated from a single cell caused a very close study of phenomena attending the growth of the most infinitesimal cell, Bacteria.

Microscopical investigation evidenced the presence of external forces because of the orientation and placement of the different kinds of bacteria cells in definite configurations.

During February, 1906, the writer published "The Spherical Bacteria Cell, the Constructor of the Earth and her Life Through the Radio-active Construction of Electro-Magnetic Particles."

Of necessity the work was much abbreviated.

A more complete elucidation of the relationship evidenced as existing between electric energy and cell-multiplication was promised as soon as the material gathered together could be arranged and classified according to the ascension of life on the earth.

Recognizing the weakness of the position of "The Unknown," the work was published with much fear and trembling, but the consideration and appreciation with which it was received by many scientific workers encouraged a deeper interest and a greater endeavour in following up the clue to the Origin of Material Form.

A still greater encouragement was derived through reading "Electrons, the Nature and Properties of Negative Electricity," by Sir Oliver Lodge. On page 151 he says, speaking of an hypothesis based on the electric view of matter:

"Were it less hypothetical a further account would be given here, but an extremely recent paper by the same great Physicist (J. J. Thomson) has tended to reduce the whole subject to a state of exaggerated uncertainty, since he gives reasons, which appear to be sound ones, in the *Physiological Magazine* for June, 1906, for assuming that only one active electron is contained in a hydrogen atom, and that all other elements contain a number of electrons comparable to their atomic weight, reckoned on the basis that hydrogen equals one. This is an extraordinary and unexpected result, and at first sight appears very unlikely, since the ordinary chemical assumption of a unit atomic weight for hydrogen has always been known to be a pure convention, made for convenience alone, and not likely to correspond with anything in nature. I do not suppose that anyone imagined that it would even provisionally be found to have a physical and rational basis."

In the superficial work already referred to were given many examples in which the hydrogen atom, as a unit weight or number, appeared to build up atoms of the various elements after the same number in grouping of figures, that were found to characterize the divisions and subdivisions of various forms of living things.

It was also shown that bacteria cells group together and multiply after the same manner as this unit weight of the hydrogen atom grouped in numbers that made up the formulæ of many chemical substances.

When Professor Thomson confirmed the unit weight of the atom of hydrogen as reported by Sir Oliver Lodge, a still greater encouragement was felt by the writer to take up the work of a "New Evolution," in the hope that greater concentration of investigation into the domain of the "infinitesimal" might meet with a reward in discovery of that which would afford the "very slight indication," spoken of by Hugo De Vries, as pointing the way to the control of life.

The declaration by Sir Oliver Lodge that the unit weight of the hydrogen atom had been proven a fact, and the assertion that such a condition had never even been dreamed of by the chemist, opens up the whole field of chemistry for exploration by the person who will enter the field as a biologist, in search for the origin of material form. Others might use the term "origin of life," but motion is life, and control of motion everlasting life.

The scientist has declared that were the constitution of water understood, the mystery of life would be solved.

Such an assertion caused the writer to investigate the movements of bacteria cells, cells that reduce solids to liquids and construct solids from liquids.

The invention of the ultramicroscope revolutionized the idea of a sharp line of separation between the organic and inorganic world of form. Under this wonderful instrument the hardest metals, when in solution, execute the same kind of motion as described by the bacteriologist as characterizing bacterial life.

Dr. Zsigmondy has stated that it is impossible to keep water free from ultramicroscopical dust particles for any extended length of time. That no matter how thoroughly water has been treated, even after repeated distillation, in a very short time dust-particles make their appearance. The thought was at once suggested, Are those "dust particles" groups of primordial particles, formed by the changing fields of gaseous electricity (or ether) that make up the atomic growth of water?

When Professor Thomson's lecture was published *re* "The Constitution of Matter," where he said, the mass of ether attached to a system is equal to the potential energy of that system, a condition was afforded from which we might expect to find the fruit of the growth of *water*.

Of these dust particles, Zsigmondy says they do not move about but appear stationary. Now, distilled water is obtained by artificial evaporation, and the activities represented in the product do not appear to become "static" or balanced, until these "dust particles" make their appearance. Their growth would represent the electrostatic field with its tension along the lines and pressure at right angles being brought under the force of magnetism, when spherical rings or closed curves would be formed. These dust particles appear as centres of tension throughout the *water*, and when the chemical substances are added to the *water* with their metal to be dissolved, the static condition of the *water* is broken down, and the energy, released, travels along in definite directions, forcing the particles of gold to move about according to the electrical energy released in the decomposition of the particles. Chemical affinity is said to be electrically directed, so that we have to deal with electric energies when investigating chemical action.

The movements attending the growth and development of bacteria cells prove their origin in the decomposition and reconstruction of electric charges that make up the atomic growth of *water.*

The bacteriologist warns the student against ascribing, as a true movement of the spherical cell, the so-called Brownian movement, which is characteristic of any particle suspended in a liquid.

The bacteriologist has failed to notice the fact that there is no movement possible in the jelly as a culture medium, until after the spherical cell has been placed in the jelly, and its power of reducing the solid to a liquid brought about this vibratory motion called the "Brownian movement."

This mysterious "Brownian Movement" is also said to hold the secret of the origin of life, and we must look for an explanation of this secret in electrical phenomena.

Just as the distilled water with its dust particles as centres of force represents a "balanced field of force," as electro-magnetic constructions, so does the jelly represent a "balanced field of force," and when a foreign substance, in the form of a bacteria cell, is introduced into the mass, the electric tension is broken down, and the decomposition of the jelly into a liquid is the result of a reconstruction of the field of ether that held each atom as a fixed point in the mass. *Water* must always be the first electro-magnetic body formed by the combination of the different motions made up by the different kinds of electric charges, beginning in the ether.

The description given regarding the origin of the elements and of cell life is, of necessity, very limited in detail.

The cost of the work if printed in detail appeared too great for the publisher to assume.

The work being of a very technical character, it was not thought that a sale would be large enough to cover the expense, the illustrations alone making over thirty pages.

The contents of the following pages should, however, establish the indisputable discovery of the origin of the elements and of cell life, also the possibility of control of life itself; when man understands the living phenomena shown in the decomposition of a system of groups of atoms, continually changing their conditions, as growths, because the fields of gaseous electricity changing their places and thus bringing about the decomposition of electric charges, and rebuilding them, are continually "sustaining" their life as an everlasting life in a circumscribed limit.

The cost of the publication is being borne by the writer, in the hope of assisting in the discovery of that which will afford humanity a release from the thraldom of the earth, as a grave. The earth is a leech, and does not release any form of activity from her confines, unless the push of the inner core forces that activity in another direction.

Does the child in the mother's womb conceive of any life without those confines? Yet he is forced from that place, and behold, the possibilities which lie before him.

The earth is the womb of Mother Moon, and the Sun the father or great centre from which arises the continual food that should make the newborn child a radiant creature.

This food as radiant matter must push the creature from the earth, as the child is pushed from the womb, before he can enter upon his radiant career. As long as the brain continues to recognize the grave as the final confines of brain development, so long shall man be forced into the womb of the earth. The brain has been the centre of push since the atom with its inner core possessed an individuality. This brain or inner core has collected about itself groups of atoms that finally brought forth the human body. Shall not the brain of this human push atoms together that will give him control of life? Can he be less a builder than the infinitesimal atom from which he sprung? As it has been radiant matter that has fed life-giving forces throughout the length of time, will not this radiant matter yield up to him the secret of the food?

So far the intelligence in man has been that represented in the constitution of the shell of the atom, or the wall of the cell, a mere response to the call of filling the cavity left by the demand for energy, by the brain, and a response from the brain as a mere origin of locomotion.

As we have seen that evolution consists of a continual exchange of brain matter from centres to externals, we must recognize that the external part now represented in the body (or trunk) will become equal in "intelligence" with that of the brain itself, and we will not allow feeling to govern that which we know to be a law, but our feelings or senses will make us recognize the everlasting condition of Life.

After twelve years of search for proof of the origin of material forms from the One-walled *Water* Cell, as a living organized cell, we have been able at last to give the very origin of the groupings of the electric charges that make up the primal system, from which all forms of life have arisen.

We have been able to show that the elements are products of growth as living activities, and that growth is the result of a process of "pushing" crystalline particles together into definite groups, through the government of motion by the force known as "rotating electricity" or magnetism.

In our search for proof of this we have searched the works of such men as Lowig, Weismann, Darwin, Haeckel, Dawson, Hugo De Vries, Sedgwick, Novy, Sternberg, Lodge, Ramsay, Rutherford, Thomson and others too numerous to mention. Nothing has seemed too trivial to be investigated for an explanation of markings shown as lines of growth in Nature's construction. We have found there is no place in material forms that does not bear the imprint of the same lines we find governing the direction in which bacteria cells group and multiply.

In the earth, in the air and in water, do we find definite proportions in numbers characterizing the occupation of space by bacteria cells. Bacteria are therefore rotating groups of electric charges, and they evidence all the motions found to govern the earth itself.

THE UNIVERSITY OF ALBERTA

They are the microcosm, in comparison with man as the macrocosm, and man is the microcosm in comparison with the earth as the macrocosm.

CLARA. E. SPEIGHT-HUMBERSTON'.

Newtonbrook, Ontario, Canada.
February, 1914.

Present address
10537 — 125-St.
Edmonton.

The Origin of the Chemical Elements and of Cell Life

The fundamental principles of Organic Chemistry must be traced to their primal source before the "Origin of Cell Life" can be discovered.

Chemical substances, such as acetic acid, butyric acid, propionic acid, ammonia, carbon dioxide, hydrogen, nitrogen, phosphorus, sulphur, etc., the products of cell activities, prove the cells to be made up of these substances, because *it is impossible to conceal the fact that all existing plants and animals have originated from others of the same kind.*

If the smallest cells which we know anything about produce certain chemical substances, we must recognize these substances as the "*offspring*" of these cells, because the cells themselves increase by "*fission,*" part of the mother becoming the new cell. The *life* of the mother cell is an "*everlasting*" one because of this equal division of the mother-cell into two new cells. The only actual individual reproductions are the chemical products of the cell's activities.

The statement has been made by Tyndall, and others, that *life* is the result of "mere chemical affinity," and in order that we comprehend the meaning of this "chemical affinity" we must trace to their primal source the fundamental principles of Organic Chemistry.

Dr. Lowig, the great German chemist, says, "It is constantly becoming more apparent that the organic compounds, if all their relations are brought into view and not alone their individual characteristics, belong to distinct groups, which, as it were, correspond to the natural families of plants, and that these groups are again united to each other by a common bond."

The cell substance termed "protoplasma" is identical in constitution in both animal and vegetable cell construction, so that while we are tracing the "Origin of Cell Life" we will confine our investigations to the products of the most infinitesimal cell, bacteria, whose chemical products, in many instances, can reproduce the same conditions in animal bodies as the cells themselves, so that we have actual proof that liquids are *alive* and can produce protoplasmic cells, as bacteria, in the animal body if introduced into the body after the same manner as bacteria cells.

Dr. Lowig declares the organic compounds belong to distinct *groups,* united by a common bond.

Bacteria are divided into distinct *groups,* so that this characteristic of *grouping* is inherited from the "Organic Compounds," or chemical substances.

THE UNIVERSITY OF ALBERTA

In tracing the method of grouping we find Bacteria divided into three groups, Spheres, Rods and Spirals; but two Spheres make a Rod and three Spheres a Spiral, so that it is actually the manner of grouping of the Spheres that brings forth the other two.

Bacteria, as nature's growths, evidence a threefold constructing force in cell life, therefore we will take this number as the "active part," or primal constructing number in protoplasma building.

As chemical affinity is now declared to be electrically directed, we will have to enter the domain of electric energies in order to trace the fundamental principles of Organic Chemistry.

As we have already considered the products of Bacterial growths (nitrogen, hydrogen, carbon dioxide, etc.) to be the "offspring" of the parents of the cell itself, we will have to search for the electrical "offspring" of Nature's growths in order to find the parents of chemical substances.

The electrical theory of matter demands the growth of all forms from the same fundamental units, therefore we must search for this "sameness" in electrical energies given off from all forms of matter.

It was only owing to the discovery of radium that man was able to prove that the same kind of rays were thrown off from all forms of matter. These rays are of three kinds, and evidence their greatest activities in the decomposition of the radium atom.

These three kinds of rays are called negatively charged particles, particles positively charged, and a third kind which is not influenced by a magnet, the other two being deflected by a magnet to a certain extent.

If all forms of matter are giving off these rays as their "ray offspring," the parents of the "offspring" must also be of the same kind of rays.

If the activities of the radium atom are investigated, it is found that a "system" of growth as well as decomposition is at work within the atom. Sir William Ramsay has seen the helium atom formed or grown from the activity during decomposition. If helium is formed, is not negative and positive electricity, or positive particles, also formed, as a "reconstruction" of the decomposed products into the primeval ether? Where does the continuous luminosity and heat arise, except in these two processes of decay and growth?

There is also an emanation arising from the activities during the so-called decomposition of the atom of radium, which is in the nature of a gas. This gas is more wonderful in its activity than are the radium rays, making inactive bodies in its immediate neighborhood become active. This emanation acts the part of a "breath of life," and we have definite proof that the emanation can make that which has been considered dead to become alive or "active."

The radium atom proves to be a system of electricity in continual activity, made up of three different kinds of electrical particles. We are, therefore, warranted in regarding this system as a "centre of control" in a process of decomposition and reconstruction, the "emanation" proving its origin in the changing fields of ether produced by the decomposition of electrical particles into primal ether. If this were not so, the emanation could not attach itself to substances in its immediate neighborhood, and bestow activity on the inactive. If it is ether which surrounds all atoms, and binds them together, when those atoms are brought into decomposition the fields of ether must also be decomposed and suffer a change of combining properties.

As we have been tracing the parentage of chemical substances to electrical energies, we must, after the same manner, trace the parentage of the organic cell back to the atom itself. In the organic cell we have an inner core, or nucleus, and an outer shell, or wall. In order to establish a sameness between atom and cell, we will look for a force in electrical activities that produces spherical or circular rings. We find this constructing force called "magnetic lines of force," and we are told they are always closed rings or curves.

Sir Oliver Lodge (and others) tell us that this magnetic force is developed as a superimposed field (magnetic field) upon a steadily moving electric field generated by a charged body.

The following extract from "Electrons, or the Nature and Properties of Negative Electricity" (Lodge), explains the whole phenomena attending the construction of an atom like radium, and an organic cell. He says: "For just as there is no electrostatic field save that extending from one charged body to another, so there is no electric current except the motion of such a charged body, and no magnetic field except that which surrounds the path of this motion."

If this statement is correct, there must be two "bodies" or parts to the most infinitesimal particle. The atom must represent two bodies as indivisible, and as an electrostatic field extends from one charged body to the other, the space between the two parts must represent an electrostatic field. That the atom is spherical must also be true, because a magnetic field is produced by the motions of a charged body. The magnetic lines being circular would bind the two bodies as a spherical whole, because the positive lines beginning at one body start out in all directions. When these lines were forced to take on a circular form the sphere would be formed, because rings forming from all directions would produce a sphere.

In describing the appearance of magnetism Sir Oliver says, "The phenomena of magnetism make their appearance. A new set of lines of force, quite different from the electrostatic lines (although they, too, exhibit a tension along them and a pressure at right angles) come into temporary being. These do not—like the electric ones—originate at one place and terminate at another, they are always closed curves or rings, and in the present simple case (uniform charge in motion) they are circles all centred upon the path of motion of the charged body. At any point of space there are now three directions to consider. (1) There is the original direction of the electrostatic field; (2) there is the direction of the motion—that is, a direction parallel to the movement of the charged sphere; and (3) there is the direction at right angles to these two, this last being the direction of the magnetic lines of force—the direction of the magnetic field."

As we cannot see the construction of this inner core and outer shell of the atom, we will examine the structure of protoplasm, the organic cell substance.

The biologist says, "Protoplasm is the physical basis of life, and is found identical in plant and animal cells. We know a great deal about this peculiar substance, or rather combination of substances, but there is still a great deal more that we do not know. There have been many opinions as to the structure of this living matter—that it is fibrilla, that it is like a network, that it is a mass of foam. The microscope does not tell us all that we should like to know—and it tells us one thing at one time, and other things at other times. It is quite possible that the "structure" of protoplasm is different in different organisms, or that it is different in different parts of the same organisms, or that it is different within the same cell under dfferent conditions."

Protoplasm as "fibrilla" in structure answers the description of "lines of tension between the two bodies" described by Lodge as constituting the phenomena of electricity. Positive electricity starts out in all directions in straight lines (Plate 2, fig. 1,) and when the structure of protoplasm became positively electrified, the structure would be fibrilla." When the lines of force at right angles to the lines extending from one body to that of the other (as an electrostatic field with a tension along the lines and pressure at right angles) became in government, the structure would be a "network," and when the structure became negatively charged, or equal in parts throughout the mass, it would be a structure, as "sea-foam." These three conditions are all displayed in the different kinds of bacteria cells in the construction of colonies. There are the cells forming in straight lines; forming a network; and the colony, looking as though made up of grains of sand.

We have already shown how the straight positive lines are productive of magnetic lines which form circles. When these circles are forced to decompose, straight lines would form. As these lines are at right angles to those of the electrostatic field, a network or crossed lines would be formed.

We picture (Plate 1, fig. 5,) a bacterial growth where the straight lines decompose into, first, rods, and then into spherical groups.

What explanation do we find in the electrical theory of the constitution of matter for this right to trace the organic cell to the primal atom, and this atom through the constitution of the living cell? How is it possible that there are these differences in the structure of protoplasm, and a sameness of lines in different directions, as a result of electric energies? In the first place, a photograph of negatively charged dust particles (Plate 2, fig. 5,) shows individual spherical particles. The photograph of the positively charged particles evidences straight lines stretching from a centre (Plate 2, fig. 1).

The authorities on electrical forces tell us that the properties of negative electricity are pretty well known, but those of positive electricity, or the positive atom or electron, may not have been yet discovered. They say the positive condition of electricity has not been met with in a mass of less than the mass of a hydrogen atom, and that there are, therefore, about 1,700 negative electrons in the mass of a positive atom of electricity. They estimate that this positive atom is made up of all the different kinds of charges of negative electrons, each charge being made up of a different number of electrons, thus constituting a series of "groups" of negative electrons, each group representing a definite charge.

As all groups must originate in the same fundamental units, in order to trace the cause of the differences we must first endeavor to trace the number of combinations that can arise between electric and magnetic particles or forces.

The possible combinations arising from these two forces would be five different forms, and there would be evident in the history of the earth the necessity of five divisions, in order to show the manner in which life ascended to its highest product in Man. This explains the origin of the *five* races of mankind. This explains the origin of the *five* continents, and of the oceans as *five* in number. The law of equal distribution in "groups," as determining the construction of the positive atom of electricity, or, as it may be, the atom of matter, has governed in the creation of the earth and her life, from the beginning of the individual unit, until the accumulation had reached an equal distribution between electric lines of force occupying different positions in space.

The combinations between the two forces would be:

(1) Electric.
(2) Magnetic.
(3) Electric-magnetic.
(4) A union between the Electric and the Electro-magnetic.
(5) A union between the Magnetic and the Electro-magnetic.

These five forces represent the different kinds of charges that would make up the positive atom of electricity or the atom of matter.

As we have already found an explanation of the inner core and outer shell as the construction of an atom, in the description given by Sir Oliver Lodge of an electrified body, we will now endeavor to find the meaning of the declaration made by the biologist, that the cell wall does not appear to be *alive,* and we will find an explanation of this "seeming lifelessness" in what is termed "a resting condition" by the bacteriologist, when describing certain conditions in the life-history of bacteria.

Many species of bacteria in cultures appear quite motionless at one time, and at another we find them very active. Before sporulation the cells come to rest. "The contents of the cell are at first homogeneous, and the first indication of the beginning of sporulation

THE UNIVERSITY OF ALBERTA

is the appearance of very fine granules in the protoplasm. Some of these are larger than others. One of these located at a certain place in the cell gradually increases in size, probably because the other granules gather or flow together at this point. The result is a roundish or ellipsoidal bright body, which at first has no definite envelope or wall. Presently a distinct spore-wall does form, which may be due to a condensation of the protoplasm of the cell around the central body. At all events the protoplasm of the cell disappears, as can be shown by plasmolysis, and, in part, at least, makes up the substance of the spore. The spore, therefore, may be considered as the condensed cell contents. It contains all the proteins of the parent cell, and, when completed, lies surrounded by an aqueous liquid inside the otherwise empty shell or cell-wall or membrane. This original cell wall soon softens and dissolves, and the spore thus set free." (Novy).

In this description of sporulation by Novy, the bacteriologist, we have an explanation of the part an "electrostatic field" plays in the life-history of an organic cell.

The nucleus of the cell and the "inner core" of the atom are individualized as such by an electrostatic field, formed by the products of growth of the outer wall or shell, and the products of decomposition of the inner core.

In the description of sporulation, where the contents of the cell appear homogeneous, we have the equalization of the nucleus and the liquid in which it lies, as a mass of equal condensation. The breaking up of this mass into parts or centres of force now represents an "electrostatic field," because the granules act the part of a centre or tension, the fluid being the supporting medium. The decomposition of the fluid on one hand thus liberating gas, forces the granules together, and this "pushing force" of the gases in combustion is the great and only force in what we recognize as "locomotion." There is the continual "push" toward a centre, and the continual "push" from a centre to the circumference of a cell or an atom. Because of the perfect adjustment of balance in motions, we have failed to recognize the origin of the organs of locomotion of the tiniest cell, the bacteria, and consequently of all other cells.

For instance, the spherical cell, or micrococcus, is said to possess no real powers of locomotion, any movement observed being due to currents in the liquid in which it is found. The fact is the cell was implanted in a jelly as a culture medium; the jelly, being an immovable mass, could not break down into liquid form until the cells brought about these "currents in the liquid" in which the cells are seen to flow. This mysterious Brownian movement, common to all particles suspended in a liquid, is the movement caused by the decomposition of the "field of force" represented in the water cell, which is a living one-walled cell, into gases and the reorganization of the gases into new fields of force. The distance of push toward a centre, and the displacement of that which already occupies that position, bring about this "vibratory movement" which is said to hold the secret of life, or a push towards and a push from a given point. That this point is one of a centre in a field of force, and also spherically stratified, is proven by the fact that the Brownian movement is described as "an irregular zigzag line to and fro, vibrating unsteadily about a mean position seldom reached." (Lehmann). The breaking down or displacement of the whole into its parts would bring forth the movements as described, because the parts or groups of an atom are probably made up of different kinds of electrons, so that each charge would move a definite distance and in a definite direction.

We might further illustrate this origin of "true locomotion" by considering the phenomena attending movements of gold particles in a colloidal solution. Zsigmondy says, in his work on colloidal solutions, that no matter how thoroughly water was distilled, in a very short time "ultra-microscopic dust particles" made their appearance in the water. These dust particles did not move, but were suspended in the liquid, motionless. What does this signify? That water being a growth, and a one-walled cell, the fruit of the growth must make its appearance, and the crystalline particles gathered into groups as centres of tension in an electrostatic field of force. When the dissolved gold particles were added to the water they moved about as we find the Rod and Spiral bacteria moving. Why? Because the added matter broke down the "field of force," and the generation of gases pushed the particles about in definite directions. If electricity is a condition of ether in the act of "grouping" and so building up electrostatic fields of force, we must look to the phenomena of gaseous occupation of space to discover the origin of the powers of locomotion in the organic cell.

As Sir Oliver Lodge has declared, there is no electrostatic field save that extending from one charged body to another, and "no electric current" except the motion of such a charged body, we are here forced to acknowledge the "electric currents" passing from the core of the atom, or the nucleus of the cell to its outer shell, or cell wall, to contain the amount of energy as electric charges, that will carry or move the atom or cell just as far as the charges will move before they are decomposed into primal ether or gas. The direction in which the atom or cell will move will be governed by the two activities, decomposition and reconstruction.

The core of the atom and its outer shell represent two charged bodies, and the charges being generated by the core are its organs of locomotion. The charges, as organs of locomotion, when forming in straight lines, as positive charges, act the part of a "food" for the outer shell or wall of the organic cell and that shell or wall in turn finally sends forth a "filament," and we recognize this "filament" as an organ of locomotion arising from the cell-wall. In fact, this filament arises from the nucleus, but we do not see it, because it is the product of the decomposed field of force, as a gaseous field between the nucleus and the wall. There could be no individual nucleus and wall, or core and shell, unless there was

THE UNIVERSITY OF ALBERTA

a dividing substance between the two. Again, the organs of locomotion belonging to the cell wall (atom shell) do not contain the power to move continuously, without assistance as a "reflex action" maintained in the medium in which the cell or atom is placed. The lowest forms of cell life are forced to move by the continual decomposition of the water cell into gas, this gas, as before said, forcing its occupation of space already held by the organs of locomotion of the cell. We are told that vegetable forms of life do not possess the power of locomotion, yet the Volvox (a vegetable form) moves exactly as other spherical forms covered with cilia. Why? Because the cilia are continually decomposing into gas at the end of the cilia, and the expansion of gases forces the cell a definite distance. The substance thrown off from the tiny cell in turn causes decomposition in the water cell, and so there is a reflex force, and the cell moves along in a "wobbly" manner, the result of equal distribution of "groups" as centres of tension in a definite electrostatic field undergoing decomposition.

We will here be forced to notice the different kinds of electrostatic fields possible, fields that will possess a definite time in growth, maturity, and decay. There will be just as many kinds of electrostatic fields of force as there are different kinds of electric charges in the positive atom of electricity or of matter. These charges, constituting "groups," will eventually bring forth in their greatest strength a definite number of fields making up the spherical stratification of the atom, of the organic cell, and even of the earth itself. We have already enumerated the different combinations into which the ether can group, as Electric, Magnetic, Electromagnetic, etc., and find we have five forces, or five kinds of electric charges, from which matter has been constructed. In investigating bacteria growths we find there are five different ways in which the cells group in accumulation.

We confine ourselves to the spherical cell alone, as being nearest the individual atom. If we look at the manner in which the cells accumulate (Plate I, fig. I,) we will note the evidence of the perpendicular line of force, the two cells remaining as "biscuit-shaped." The first two are equal in space, the third pair show a horizontal force of repulsion. In the second manner of growth we have the chain forms, as we see positively charged dust particles arranged. In the third manner of growth we have the growth of one to a tetrad, or group of four. In the fourth we have a group of eight cells, the Sarcine; and in the fifth, the Staphylococcus or grape-like bunching.

This growth of the cells, as one, two, four, eight, we will find gives us the key to the correctness of a system, commencing in the inner core of the atom, as a centre of balance, wherein was forever fixed the government of "division" as groups of negative electrons into primal ether, and a reconstruction of ether into primal groups of electrons, moving in definite directions.

In following this great centre of government in motion, in its government of direction and the distance an electron should move, we are brought to its greatest height in development in the construction of the brain of man. The brain is a spongy mass, or the kind of structure described as "sea-foam" in protoplasm. This sea-foam, as a primal form of equal distribution of groups in spherically stratified electric charges making up an electrostatic field of force composed of all the different kinds of electric charges, grouped in centres as points of balance, has, as a process of accumulation, pushed its place in nature's constructions as the brain, and the brain is the inner core, and the trunk the outer shell, of the human atom.

The trunk of the animal form is the place where food is manufactured into atomic weights, of definite combinations, these combinations being distributed in their most infinitesimal parts by means of the blood-vessels, the walls and the blood plasma taking equal part in the carrying of the blood corpuscles, through the force of osmotic pressure in the walls, as an internal or push from the membraneous centres in their decomposition, and the opposite push as "plasmolysis," or the decomposition of the water cell into primal gases or ether. The walls of the blood-vessels fill the same place in the activities of vital processes as are carried on in the constitution of the cell-wall, this same cell-wall being "supposed" to be "not alive."

The reason man has not understood the physical construction of the cell-wall is because he has failed to recognize the substance occupying the space between the nucleus and its wall, and also between the inner core of the atom and its outer shell.

Professor E. Pfluger, of the University of Bonn, suggested, many years ago, that the essential difference between living protein and non-living protein lay in the fact that in the former, oxidation or transformation of energy is internal, and in order to account for this internal oxidation, the possible presence of cyanogen (a compound of carbon and nitrogen) might have been produced during the incandescent stage of the earth's history.

The origin of living cells must be looked for at the place of decomposition and reconstruction of electric charges into primal ether, this ether taking the part of exhalation and inhalation, or the breath of life. We will be able to prove, further on, that it is not cyanogen or carbon or nitrogen which forms the basis of vital processes, but the fixed combination of different kinds of electric charges, making up a definite number of atoms, all containing the same weight, but representing different positions in space, because of different degrees of expansion, or conditions of "tension."

The physicist, in his endeavor to produce "artificial life," has been successful only in obtaining proof that it is in the generation of gases by the action of one chemical substance on another, that the likeness of the vital processes has been demonstrated, even in the slightest degree. That this likeness has been possible has only been so because of the presence of water as a primeval one-walled cell. The so-called artificial forms can only grow or develop

THE UNIVERSITY OF ALBERTA

according to the number of different directions held in the decomposition products of the chemical substances themselves. The water-cell can use only certain combinations of atoms in decomposition as food for growth, and when that food is exhausted the growth must cease. The water-cell as well as the animal cell forms certain products that in time react on its own growth, and cause its "death," as we find in the case of bacterial products; if these products are not eliminated, the cells die of their own chemical construction. It is the law of electrostatics, each field occupies a definite place in space, no matter where that space is found, in the animal body or elsewhere.

The "streaming" motion representative of protoplasmic life is explained by the manner in which positively charged dust particles move. They start out in straight lines from a centre. When the one-walled cell (as a last state in the process of decomposition into gases) breaks up into its primal parts there is a collection of the crystal particles belonging to the whole field, undergoing decomposition, and the reconstruction forces the accumulation along lines which evidence a "streaming" motion.

The mysterious cell-wall life is explained in the fact that the membrane is in a state of tension, or a "resting condition," and the changes of motions are centred in the fields of ether themselves, and cannot be discerned by man until he recognizes the physical constitution of that which governs the laws of locomotion in both cell and atom.

The cell-wall, in the most minute forms (bacteria) as a spherical cell appears to be devoid of organs of locomotion, but the organs are there as "reflex" activities, generated by the cell's production of gases travelling in opposition to the gases generated by the decomposition or combustion of the water-cell. In the rod-shaped bacteria (in which two spheres make up the rod) the organs of locomotion are recognized in the flagella or filaments which arise in the cell-wall. These organs of locomotion are found in different positions, as a cilia projecting from the surface from all points, as filaments from each side of the cell and from one end or sometimes from both ends of the cell. The first, as cilia, show the positive straight lines equally distributed; the filaments from the sides of the cell, show the positive lines from two opposite fields of force; and the flagella at the ends of the rods, the positive lines from two opposite poles. The liquid which is produced by the activity of the cells is as much a part of the organs of locomotion as are the filaments or cilia, because "locomotion" is a force of motion caused by the growth of atoms making up a definite positive field of force in definiet directions, in opposition to the products of decomposition brought forth by the reflex action of the water-cell.

Living forms owe their increase in size to this process of accumulation between water crystals, as food and force, because in water as a one-walled cell were contained all the different kinds of motions, as initial stages in motion, that could enter into a spherical stratification. Before any new form could begin, a start must be made at the point of decomposition of some particular motion held in the water-cell. The different kinds of motion (as electric charges) produced different kinds of cells, but the number of kinds were determined in the different kinds of charges which made up the positive atom of electricity or the atom of matter.

If there were a number of different kinds of charges in the atom of matter, there must have been the same number of different kinds of atoms, when each charge had acted the part as an initial stage in the reconstruction of charges.

We have shown the possibility of five different combinations between electricity and magnetism, and, therefore, we have five different kinds of atoms which will act the part of seeds in the growth of material forms. The same conditions as are found to govern to-day five distinct divisions in the history of the creation of the earth and its life, and the two gaseous forces as inhalation and exhalation, these forces having the same atomic values in Nature's activities as we find represented as forms of life or matter. It is taking notice of the whole division of matter, from the gaseous ether to the solid crystal, that will afford the key to the opening of the door of mystery which has thus far barred the way to the control of life.

Sir Oliver Lodge has said that magnetism is electricity in rotation, so that when we have a spherical cell under consideration we have a force of electricity or electrons in continual motion in circular form.

The seven different kinds of atoms we have as a primal group, will afford a grouping in two parts. As two of these atoms belong to the forces of inhalation and exhalation, we would have a third atom as a "neutral" atom, a centre about which the two opposite motions (inhalation and exhalation, or towards a centre and from a centre) would meet and accumulate charges until a critical condition or tension was reached, when the changing fields of ether would break down the accumulations, and new centres would be formed. To this phenomena we must attribute the origin of the "Brownian" movement, now said to hold the secret of the control of life.

The other four atoms make up the seven as a whole group, a pair of "inner cores" and a pair of "outer shells" or a grouping of four atoms, where the continual readjustment of particles from a centre to the outside, and from the external to the internal movements, conditions we know to take place in the growth of organic forms, as the smallest forms of cell life.

The inner core of the atom must be considered as filled with ether, as well as the space between the core and shell, because of this internal oxidation in living protein. This division of the primal group into two parts, one a dynamic part, consisting of three atoms, and a static part, made up of four atoms (representing the origin of the grouping characteristic of the animal cell, where is found the nucleus, nucleolus, the substance in which these two are

THE UNIVERSITY OF ALBERTA

surrounded, and the wall surrounding the whole or a final spherical stratification), brought about the adjustment of motions, representing sensation, nutrition, locomotion and reproduction.

This group of three is the origin of the grouping of atoms which governed in the accumulation of matter in the construction of the brain, the group of four atoms determining the origin of the animal body, or trunk.

The continuity of life is now accounted for when we recognize the fixed laws governing the atomic grouping of electric charges in the construction of material forms.

The continual accumulation of the growths of atoms by means of the grouping of the inner core and outer shell, each part becoming an individual atom, explains the mode of growth characteristic of the bacteria, and termed "multiplication by fission." The cell divides into two, therefore the mother cell becomes part of the new cells.

The meaning of this manner of increase is a mystery, but we find an explanation of its origin in the part played by the substance between the inner core of the atom and its shell, or between the contents of the cell and the cell wall. The inner core, or nucleus, is continually taking from the shell or wall material for its continued activity and giving back the products of this activity to be taken up by the shell or wall and readjusted as centres of tension between the shell or wall and its external surroundings. In the atom this external balance brings about chemical affinity, in the cell organs of locomotion of accumulation of cells.

The inner core of the atom and nucleus of the cell are therefore bound to the shell and the wall by the forces of inhalation and exhalation, and half of the inner core belongs to half of the shell, and half of the shell to half of the inner core, so that when these activities reach their highest condition of growth, the two halves, with their fields of ether or gaseous electricity, are brought under control of the force of magnetism, because the charges of electricity begin to "rotate" in two opposite directions, and the division of the cell into two parts begins a "constriction" in the central part, because the gaseous electricity between the wall and nucleus or contents of the cell is combining with the gaseous electricity or inhalation from the external part of the wall. This division by "fission" is an exhibition of the values of fixed numbers in the grouping of primal or primeval particles of atoms, which brought forth the earth and her life.

The spherical cell multiplies in various numbers, and these numbers are fixed and do not vary unless the food differs. There are spherical cells which divide into two separate cells, as pairs, two cells attached, looking like two "biscuits' (the fixed grouping of the brain convolution) flattened at the place of adherence. There are also individual cells apparently without mates. In another mode of accumulation there are cells which form groups of two, four, and eight, as a cube, also these numbers in straight lines, and still greater numbers. A fifth mode of grouping is found representing a bunch of grapes, very often containing seven cells.

This method of grouping in numbers is "inherited" by the rods (which are made up of two spheres or the grouping of pairs of spheres). The rods accumulate in straight or curved lines, in an envelope showing 1, 2, 3, 4, 5, as different numbers in grouping. (Plate 1, fig. 2).

The spirals, made up of three spheres, group in definite numbers, but this value of numbers has been taken little notice of because of the ignorance of man regarding the "breath" of life of the atom itself, and its continual multiplication because of the different directions in which primeval or primal electric charges are forced to move.

Sir Oliver Lodge has stated that the change in the orbital path of an electron will cause radiation, as well as the retardation or acceleration of an electric charge. We have, therefore, the explanation of the origin of the rays thrown off from all forms of matter. In the decomposition of the fields of ether two opposite fields would force the change of path of the electrons, and the condition of growth represented in a spherical field in its greatest expansion, would, when broken down, bring into opposite directions many of the electric charges composing the centres of tension, and thus some would be retarded, and others accelerated.

In the continual change of positions taking place in the atomic construction of gaseous electricity, there would be a continual generation of heat and light rays, and this continuity of atomic activity forces the recognition that "the descent of man" must be traced to the grouping of seven primeval atoms, where the male and female were one as the shell and inner core of the atom itself. The brain and body of the human form had their origin in the first fixation in groups in the beginning, and there has never been a "missing link" between the grouping of that particular atom through its fields of gaseous electricity until man was brought forth on the earth.

Lord Kelvin has declared the grandest discoveries of science have been the reward of accurate measurements and patient and long-continued labor in the sifting of numerical results. To this "long-continued labor" in the sifting of numerical results we owe our discovery of the origin of the weights of the chemical elements.

When Dr. Lowig declared the government of "grouping" in the constitution of organic compounds, the resemblance between the manner of grouping of bacteria cells and that of chemical substances was searched for, and the result was the discovery of the origin of their weights in the fixed grouping of three and four atoms, of equal weights or value in gaseous electricity, their differences originating in the particular kind of electric charge that, as a product of decomposition, provided food for the growth of the atom.

In this system of three and four atoms with its attendant mass of ether, we have the weight of the smallest collection of electric

THE UNIVERSITY OF ALBERTA

charges making up an individual atom that the physicist has yet met with, and it is the weight and mass contained in the hydrogen atom.

As Sir J. J. Thomson has shown by experiment that the hydrogen atom actually possesses a unit weight in relation to the weights of the elmeents, we will consider this system of seven atoms to be atoms all of equal weight, but in different stages of activity. That from this primal system, as a fixed group, all forms of matter have evolved, we will be able to prove by means of the numbers of atoms which group in numbers that make up the System of Chemistry.

This system, as a system made up of equal parts, and made unequal under conditions of expansion of gases, in size in certain of its parts, will explain the origin of Professor Haeckel's Moneron, named by Huxley "Bathybius Haeckelii." This animal growth covered the sea bottom for miles, as a sort of slime, and Haeckel says, "Huge masses of such slime-nets crawl upon the deepest bottom of the sea."

The picture given of the species Bathybius Haeckelii (Huxley) shows very plainly the differences in expansion of gases in the "holes" or spaces seen throughout the "nets," some being very minute and others quite large. Also they are of different forms (Plate 1, fig. 5). The whole mass "crawls" or moves as one body, and again proves that motion in any form of life is due to the continual change of places of primal particles under conditions of decomposition and reconstruction of gaseous electricity. Space is filled, and there can be no movement except by means of continual change of position in fields of ether as primal forces of decomposition and reconstruction under fixed duration of time, and fixed distance in movement and direction of movement.

Professor Haeckel says of the Monera, the lowest cells from which he has traced the descent of man: "However thoroughly we may examine them with the help of the most delicate chemical reagents and the strongest optical instruments, we yet find that all parts are completely homogeneous. These Monera are, therefore, in the strictest sense of the word, 'organisms.' Without organs, they can only be called organisms in so far as they are capable of exercising the organic phenomena of life—of nutrition, reproduction, sensation and movement. Although in all real Monera the body consists merely of such a small living piece of plasson, yet among the Monera which have been observed in the sea and in fresh water, we have been able to distinguish several different genera and species, varying in the mode in which their tiny bodies move and reproduce."

This recognition of different kinds is only possible because of the movements and the mode of reproduction of the cells, so that we take these facts to prove the value of our discovery of a fixed number, characterizing the directions in which primal particles are forced to move, and that, whichever particle affords a "condition as food" (because of its decomposition into ether or gaseous electricity) for the beginning of a new growth, that cell will move in a direction governed by the motion of the fields of ether providing the food for the new growth.

The meaning of "reproduction of its kind" is a mystery to man, and will remain so until he recognizes the cell life of water.

In this system of equal values of seven atoms we would have the parentage of the Monera explained, although it is improbable that the description given by Haeckel regarding the "homogeneous" construction of the plasson substance may be taken as literally true, because the ultramicroscope has shown us that it is highly improbable that such a condition as "homogeneous" in any atomic construction is possible. The differences in size of the spaces in the slime-nets of the Monera prove this difference in expansion to govern in protoplasmic formations.

Primordial System of Grouping in Atomic Combinations.

This system made up of the grouping of three and four atoms, all of equal weight, their differences determined by the kind of electric charge that provided food for the growth of the particular atom, possesses the following characteristics:

In the first place, the construction of the atom with an inner core and outer shell, representing two conditions of "solids," possesses also three conditions of gaseous electricity, always in activity. The core of the atom is filled with gas, or ether (it may consist of a number of spherical points, each point held as such by the circulating ether). The space between the core and the shell is occupied by gaseous electricity, and the space between the shell and its surrounding material is occupied by the same gaseous electricity. If this conception was not a fact, there could be no "individuality" in the atomic world of matter.

We have, therefore, three different positions in which gaseous electricity is forever at work bringing about the decomposition of atoms, and forcing their reconstruction. If we consider the positive atom of electricity to be the same as the atom of matter, and also equal to the hydrogen atom, we will have positive electricity under three different conditions—decomposition, thus liberating negative electrons, in a mass equal to that contained in a positive atom; reconstruction, or a process of forcing the grouping of negative charges; and a third condition where the charges themselves come into centres of balance, representing the different kinds of centres that could be built up by the different kinds of charges, because of the directions in which these charges were forced to move. This third condition might be termed a "magnetic field of matter," the continual breaking down of which would liberate the charges, as "rotating electricity" or electric charges, and these charges rotating about each other as centres of force would build up the atom with its inner core and outer shell, before the charges became equally distributed from three directions, the

THE UNIVERSITY OF ALBERTA

number at any point of space arising from the force of magnetism generated by a charge in uniform motion, as described by Lodge.

Before a balanced condition in the construction of atoms would be reached, there would be built up four atoms as an indivisible group, because of the electrostatic lines of force—show a tension at right angles, and the magnetic lines are at right angles to those of the electrostatic ones; so that there are four lines of force to be balanced in the charges produced by the decomposition of a magnetic field of force or of "matter."

Sir Oliver Lodge has said a negative electron can travel without any association with matter. Does not the negative electron obtain its power to travel, apparently alone, from the force of combustion of the charges released in the decomposition of a positive magnetic field of gaseous electricity, each part of which is equal to the mass of the positive atom of electricity or of matter?

However, we know that in the radium atom we have all the centres of activity held in this group of three or four as a primal group of atoms in the construction of material forms, and we will be able to prove the origin of radium itself in this grouping of four as an internal force of "oxidation," found only in that activity which constitutes the "vital processes of life."

In following the development or growth of this system, we will consider the group of three to constitute the origin of the brain, and the group of four the trunk of the body. Under such a conception, these two groups will have to be considered as separate in some phases of their multiplication, while in others a collective or a union of the two may be shown.

The construction of the atom, as described, will show the government of accumulation amongst primal values of gaseous electricity in atomic combinations to be a continuous growth, as doubling, because of the readjustment of perpendicular and horizontal lines of force (carrying matter) through electrical and magnetic energies.

As there are three different positions in which gaseous electricity occupy space in and about the atom of matter, and these three positions are held as such by electrons or ether moving in opposite directions, as food taken in by one part of the atom, and life-products given off in return, in both core and wall, there will of necessity be six stages in multiplication, as fission, or doubling, before the fields of gaseous electricity become equally balanced throughout the mass of gaseous electricity representing the whole occupying space.

If we increase this Primal System of three and four six times, we will have the weights of all the different chemical substances which could enter into the final evolutionary product of an indivisible "spherically stratified" atom, which has been called the human atom, or the animal cell.

The manner of increasing these fixed groupings must be followed so as to ensure the construction of the individual forms of life, representing the smallest as well as the greatest, and in order to do this we must have in every stage of increase all that which has preceded it.

To increase 3-4 to 6 and 8 we will have (6-8), (3-4), with its attendant mass of ether at its breath of life, for a second increase.

For a third increase we will have (12-16), (6-8), (3-4), with its attendant mass of ether.

At this stage, there is held in the three combinations all the different atomic groups of this initial (3-4) as an inner core or nucleus of the most infinitesimal brain cell, and just here we must pause to show the proof of the correctness of this grouping in primal particles, which laid the foundations of the earth, and even separated the whole mass of universal matter into a definite number of planets, etc.

In these three stages of grouping we have six combinations, or five arising from the primal 3-4, and each of these stages represents a "seed" which will control the form that shall arise from the decomposition products taken as food, when each of these "stages" is broken down as magnetic fields of gaseous electricity, because all forms of growth must commence at the point of production of a gas. The biologist declares the nitrogeneous-carbon compounds to furnish the vital processes of life, but it is not nitrogen or carbon, but a fixed group of "fields of ether" changing their places in space, that fixes oxidation as "the breath of life" in the confines of the inner-core of the primal atom of matter. The continual multiplication of this group brings forth definite weights, as groups, of atoms, and we recognize these groups as carbon, nitrogen, oxygen, etc., and say all things have been produced from these atoms. But that will not take us far enough back to the origin of living things, we are forced to recognize the centre of control of motions to be held in the fields of ether occupying the smallest space.

Under the present conception of Evolution there has never been an explanation of how it was that forms of life increased as though a result of accumulation of smaller forms, yet these smaller forms continued as individuals along with the larger growths. The description already given of the constitution of the atom and its balanced grouping provides a way in the powers of separation recognized as negative electricity.

Negative electricity appears to be a form of condensed ether, representing the smallest quantity that can be held as an individualized particle of energy. In investigating the phenomena attending the laws of "grouping," we find this negative force bringing about the individualized value of groups as one whole individual of a set making up an electrostatic field. Each part of the field eventually becomes a living cell. The movements brought about by the breaking down of an electrostatic field, or magnetic field, fix the initial stages in motions that will eventually bring forth a definite form of life, either vegetable or animal. This is why we must recognize the organs of locomotion as arising in the one-walled water-cell.

The atomic weight of water is given as H_2O, or a weight equal to 18 hydrogen atoms. As there are three different fields of gaseous electricity in the construction of the primal atom, each field being

THE UNIVERSITY OF ALBERTA

made up of two parts or direction of movement, it will be easily seen that when these three fields have grown to their greatest extent as individualized, unbroken fields, their contents, representing all the different directions in which electrons can travel or move, will be the weight of eighteen atoms, when the magnetic field is broken down and the charges are "rotating" about each other in all directions.

This stage of spherical stratification will bring about the water-cell as a living one-walled cell, and the force of negative individualization would cause the separation of the first spherical stratification of atoms producing a globe of water, into different parts, those parts being governed in number by the different fields, as Electric, Magnetic, Electro-magnetic, a union of the Electric with the Electro-magnetic and of the Magnetic wtih the Electro-magnetic, or five great bodies of water.

In this system of 3-4, with its mass of ether, plus 6-8, 3-4 and mass of ether, plus 12-16, 6-8, 3-4 with its mass of ether, we have the basis for the gathering together of all the different kinds of cells that make up the human brain. The functions of the brain have remained a mystery to the physiologist because of our ignorance of the movements spherically stratified in the water-cell. The brain has been described as a locked-up cistern of water, and the brain described as a "spongy mass." In these stages of growth we will find there are eleven different positions in which the primal combination of 3-4 are fixed as part of a system of accumulation.

Wherever this combination is found as 3-4, it will be the first group to decompose, and the electric charges, liberated in the process will bring about a new set of motions as a process of reconstruction.

In the second stage there are a group of two and an individual group. In the third stage there is a group of four of the primal group of 3-4, one of two, and an individual. In these numbers of 1, 2, 1, 4, 2, 1, there are eleven primal values that will initiate different sets of motions, that will bring forth eleven different animal forms. These will be representative of animal forms, because they belong to the dynamic part of the combination, as three continual activities, the vegetable forms becoming inactive during part of the year, or under certain conditions.

In tracing the descent of man, Professor Haeckel has traced it to eleven primordial animal forms, and he says of these primal numbers: "At least half of these twenty-two stages of evolution (that is the eleven oldest ancestral forms) are found within the Archilithic Epoch, within the first main period of the organic history of the earth, which includes the larger half of the latter, and during which probably only aquatic organisms existed," etc.

These groupings, as 1, 2, 4, governing the initial stages of growth in cell life, determine the growth of the organs of locomotion, the individual or single organ arising as a "filament" in the rod, as a bacterial cell as well as the filament attending the construction of the spermatazoon.

The brain has been the subject of much curiosity on the part of the physiologist, but mainly curiosity because it has its origin in the same layer from which the organs of locomotion arise. The conclusion was foregone. The brain as an organ individualized in its grouping of cells, by the separating forces of negative electricity, is formed of the most highly sensitized condition of matter, and governs the distance and direction in which cell activity shall move.

Negative electricity travels at a speed almost equal to that of light, so as an organ kept active through the activity of external fields of ether, the phenomena of psychic conditions are easily accounted for.

That the brain cells represent a great magnetic field of negatively constructed groups, undergoing continuous decomposition, and thus initiating the different directions in which matter must move, explains why the outlines of the skull are the same as the outlines of the magnetic poles of the earth. (Plate 16, fig. 23.)

We will go even further back than the point spoken of by Haeckel as the eleven ancestral animal forms of the human form.

Of the primitive rocks Charles Dana says: "Quartz is the first in importance. It is found under eleven different forms, limpid, quartz, amethyst, agate, chalcedony, flint, hornstone, lydianstone or basanite, jasper, sandstone, opal and ordinary sand. It has no cleavage, that is, it breaks in one direction as well as another."

When we understand the origin of the primitive rocks we will not continue to speak of them as igneous, because their formation was due to the negative separating forces of electricity, the groups in a magnetic field in the great mass of matter representing the earth, being forced to form crystal particles of definite colors, etc. These particles were forced to move in definite directions, and, as "rotating electricity," would not move very far from a central position, so that the origin of non-stratified rocks is to be looked for under the production of individualized particles of matter in their closest association, or occupation of space.

The sun, as a great electrical centre, shows the government of this number eleven, and the astronomer has found that solar outbreaks are rhythmical, and the number of spots waxes and wanes in about eleven years. Solar outbreaks are the result of the breaking down of centres as "magnetic fields of force" in the sun's envelope. That they are caused by the separating forces of negative electricity is very probable, because the earth and planets evidence the same material in formation, so that which governs the accumulation of electric charges as atoms of matter in the earth must be represented in the accumulation of matter in the sun also.

That these eleven primordial positions of the system of grouping of 3-4 determined the different forms of life and their division into classes, may be proven by the following numbers, taken from Sedgwick's work on Zoology.

To begin with the one-celled Protozoa, we find them divided into eleven divisions with four sub-orders.

The Porifera contains 55 families, or eleven for each of the five different kinds of electric charges.

The Coelenterata are divided into 165 families, or thirty-three for each of the five kinds of charges.

The Polyzoa contains 44 families.

Jordan gives 77 as the number characterizing the classification of Reptilia.

It would appear as though the reptiles wer the product of the indivisible accumulation of the primordial three and four as seven throughout the stages of growth representing the six Epochs.

The order Passeres are divided by Jordan, so that there are 165 families in the world of birds, or thirty-three for each of the five different kinds of electric charge. This is the same number that characterizes the classification of the Coelenterata.

The number of families given by Jordan of the "bony fishes" is 308 or seven times 44.

The Duck species number 44.

This evidence of "the continuity" of life is further explained in the condition under which it was possible for this association to continue. It must be remembered that all forms of living things had their development in the water, and the water, as a one-walled cell, was always the connecting medium, as well as the separating medium between material forms.

We show a picture of Nautilus Pompilius (Plate 16, figs. 4 and 5) belonging to the genus Mollusca. The outlines enclosing the nervous system of this form are identical with those outlining the human skull, cut through the jaws.

What does this mean? That the genus Mollusca is made up of groups of primordial negative charges, which finally grouped together to form the brain of man. The mollusca, as a family containing many species, were the products brought forth by the reconstruction of the whole magnetic field of gaseous electricity, broken down into its definite number of parts, some of which became food for other of its parts. The whole field, no matter how large or how small, held the initial stages as food for the growth of both animal and vegetable forms, so that the food was always present in the reconstruction of the products of decomposition.

This process of Evolution explains the inexplicable presence of food for the new species, and the survival of the fittest was not a chance or condition of "might," but a condition where the laws of balance determined the survival of the species, by a particular condition occupying space.

Man, or the human family, could not appear on the earth until a whole magnetic field of gaseous electricity had been built up in the confines of space, the breaking down of which brought forth a final indivisible combination between all the different kinds of motions that could be grouped together as centres of force in that particular field, arising through the different degrees of temperature generated by increased accumulations represented by animal and vegetable forms.

Temperature did not provide a condition for the production of living forms, but the accumulation of atomic groupings brought forth increased temperature, and, with the increase, forms that could only live as products of that increase.

The origin of new forms of life must have always been determined in the spherical stratification of magnetic fields of gaseous electricity, which, when broken down, reconstructed its substance into a spherical cell, as "rotating electricity."

In these three stages, already described as the basis for brain construction, we have the provision for what is termed "internal oxidation."

There are the weights of 16 atoms, equal to the weight of the oxygen atom; there are groups of 12, the weight of the carbon atom; six and eight or 14, the weight of the nitrogen atom, and three groups of the primal (3-4) with its mass of ether as centres of radiation when decomposed electric charges are bringing about the reorganization of the directions of motions. In other words, there are three groups of the primal (3-4) as three conditions of gaseous electricity or atmospheres, one in the centre of the core, one between the core and shell, and one outside of the shell.

The fourth stage of increase will produce the following groups: (24-32), (12-16), (6-8), (3-4) with its attendant mass of ether, plus (12-16), (6-8), (3-4) with its mass of ether, plus (6-8), (3-4) with its mass of ether, plus (3-4) with its mass of ether.

These four stages in multiplication by fission will represent the magnetic values of a field containing the primal basis for the growth of the trunk or body, while the first three represent the foundation of brain substance. This fourth magnetic condition will afford us the numbers in groupings that characterize the chemical combinations which take place between the products of the vital activities of the nucleus of the organic cell, because we do not obtain the whole atomic construction of the nucleus and cell wall with its surrounding atmosphere until the sixth stage of increase is reached.

The four stages will, however, show the grouping of atoms which formed a basis for the growth of chemical substances, just as the first three stages formed a basis for the growth of brain substance.

In the number of atoms found as groups in the brain or dynamic part of three, in the four stages of growth, we find a total of 78, and of the static part of the group of four there are 104 atoms in weight.

These numbers, when brought under decomposition as making up a magnetic field, will group in various ways.

As a dynamic grouping, the 78 will be equally divided into three parts, and there will be 26 atoms, equal in weight to 26 hydrogen atoms, that will act as a group under three different conditions, the conditions being the same as those held in the primal group of three.

There will be 26 atoms in a group in continual decomposition, reconstruction into charges, and an equal accumulation in charges as "rotating electricity" or charges, part in growth and part in decomposition. It represents the opposite direction in motion, the charges rotating about each other.

This group of 26 atoms contains the weight of the group of atoms as C_2H_2 declared by Dr. Lowig to govern the formation, by its addition or withdrawal of many chemical formulæ. He says, "The organic compounds, like the inorganic, separate into groups, whose individual members are distinguished by common characteristics, but whilst the difference of chloric, bromic and iodic acid from potassa, soda and lithia, is caused by the different quality of the elements, the variations in character of formic, acetic and propionic acid from wood-spirit, alcohol and amyl-spirit depends upon the difference in quantity of the same elements, and all new investigations have led to the same results—that this increase of weight is consequent upon a simple law, and in a great number of organic compounds consists in a plus or minus of $NO_4C_2H_2$.

This formula, $NO_4C_2H_2$, is equal in weight to 104 hydrogen atoms, and this weight is found in the addition of the groups contained in the four stages of growth in part four, making up the primordial system of 3-4. If this number 104 be equally divided between the four parts, there are 26 for each part, the same as for the equal parts in the dynamic or three part of the system.

Dr. Lowig says, "If from ethyl, C_4H_5 the group C_2H_2 be withdrawn, there remains C_2H_3, and methyl—C_2H_2 = H. Now all radicals which belong to this class, and which I have designated as the radicals of the methyl group, in all their combinations, act the part of hydrogen; like it, they unite with O, S, Cl, Br, etc., and their compounds correspond, especially with N, P, As, St, in each relation of the hydrogen compounds, to these elements. Hence the character of these radicals depends upon the hydrogen atom; it controls the combinings of the whole group, in it lies the cause of their chemical commonality, whilst the individual members, and their varying relations, are determined by NO_4 C_2H_2. Hence, I designate H as the active part of these radicals, and $NO_4 C_2H_2$ as their components. In like manner, the radicals of the groups of acids, to which acetic acid, butyric acid, etc., belong, divide into the active part C_2H, and the components $NO_4 C_2H_2$; the chemical distinction between the radicals of the methyl group and those of the individual members of the above mentioned acids, which I have generally called the radicals of the formyl group, rests, therefore, upon the chemical difference of the active parts."

Why does hydrogen control the combinings of these groups of atoms? We answer, when the whole magnetic field is broken down, the government of the negative force of separation will cause the division of the parts into smallest group of electric charges possible, which is that equal to the hydrogen atom. When a reconstruction is going on, and pairing taking place, the initial or primordial or primal group of 3-4 (as decomposition values) will make three pairs, and there will be one atom, as hydrogen without a mate, and because this atom belongs to this primal group it will be the first atom to make the connection between the two stages as collecting centres, where rotating electricity, or opposite charges, are building up new groups. This atom will act as a single atom every time and in every place, where this primal group is in the course of reconstruction, and it will in time form groups as 1, 2, 3, 4, 5, which will combine with other groups to form centres of tension, which we know as different chemical combinations.

In natural groups Dr. Lowig finds a group of atoms containing 78 as NO_4 and this number is the number of atoms in the four stages of growth of the dynamic part of the system of 3-4. This grouping would represent the positive or straight lines starting from the centre, as seen in photograph of positively charged dust particles (Plate 2, fig. 1) also of bacteria culture (fig. 2 on the same plate).

The numbers characterizing the groupings throughout the fourth stage will give the atomic weight of nitrogen, carbon, oxygen, hydrogen, 32 as that of sulphur (24 plus 32) as a magnetic group of rotating charges, the weight of iron as 56. Dr. Macallum, of Toronto University, has shown that iron is contained in the nucleus of all kinds of cells, although he has not been able to demonstrate its presence in bacteria cells, because of the minute size of the cell, but as bacteria cells are said to be composed of "nuclear matter," the iron must be present in a very diffused condition.

Iron, as a growth of eight equal parts in each of the 3-4 combination, would, as two eights combined, make a group of 16 atoms, which would offer a condition where oxygen could decompose it or force its continual decomposition into its primal parts of 3-4. This would explain why iron forms rust.

The formula C_2H, or a group of 24 atoms attached to the single atom of hydrogen, will be formed, under decomposition of this fourth stage, through the negative separating force, and as an active part will feed upon the static part made up of the whole indivisible collection of 104 atoms.

There is no statement made by Dr. Lowig concerning the government of groupings in chemical formations that cannot be found verified in the growth and development of this primal system of 3-4 group.

To continue the increase of the fifth stage we will have (48-64), (24-32), (12-16), (6-8), (3-4) with its mass of ether, as a fifth condition in grouping.

A sixth increase will yield (96-128), (48-64), (24-32), (12-16), (6-8), (3-4) with its mass of ether.

At this stage is brought forth the primal or initial stages in the growth of all chemical substances, and these atomic combinations are forever fixed as far as numbers in groups are concerned. The different forms of matter that can be made up from these fixed groups will be determined by the number of times and the number of different places in the electrostatic field, or magnetic field, that this primal combination is found, as it will always be the first to decompose and the first to provide material for the new direction in which the charges or atoms must move.

In looking at the numbers forming the groups, we find an explanation of the following declaration by Dr. Lowig. He says, "Like ethyl, C_4H_5, benzid, $C_{12}H_5$ is a member of a series in which each successive member is formed by the entrance of C_2H_2. In chemical relation, benzid behaves like ethyl; hence it is consistent to seek the cause of this agreement only in the common active part, therefore, in the hydrogen atoms; thus hydro-ethyl, (C_4H_5) H, corresponds to hydro-benzid, $(C_{12}H_5)$ H. Now, benzid, $C_{12}H_5$ minus ethyl, C_4H_5, equals C_8. If we consider the remainder C_8 as the nucleus, benzid may be regarded as consisting of the components $2C_2H_2$, the nucleus C_8 and the active part H. The formula for benzid is, therefore, $2C_2H_2$, C_8H. How this nucleus C_8 occurs in the combination, and whether it generally exists only as such, are not determinate questions, but the fact is that, by the addition of C_2, C_4, C_6, C_8, to the radicals of the formyl and methyl group, each one of the hydro-polycarbyls is formed."

The atomic weights of these carbon groups are 24, 48, 72 and 96, and we find these numbers grouping as fixed groups of 24, 48 and 96, which, when individualized by negative force, will make these numbers "part of a system" in chemical combinations. The number 76, as a nucleus, will arise by the union of 24 and 48 as an indivisible collection in pairing, thus bringing about the condition of "rotating electricity" or magnetic groups.

In this sixth stage of increase we have the work of grouping accomplished as initial stages in chemical combinations, because there has been effected the transmutation of the three fields of gaseous electricity—each field being made up of opposite streams of electric charges, arising as products of decomposition through the vital processes going on in the inner core of the atom and its outer shell, or of the nucleus of the cell and the cell-wall.

The three spaces, the interior of the core, the space between the core and its shell, and the space surrounding the shell, have been transmuted into a physical or an organic cell, containing granules, a fluid, and a wall, the description of a bacteria cell. The balanced condition of these three fields of gaseous electricity, and two of solids, constituting the primeval atom, reaches its greatest collection, as centres of force, in the animal cell as a nucleus, nucleolus, and wall, the three conditions of gaseous electricity, becoming three individualized centres of motions—the nucleus a centre for the distribution of matter into two parts, the right and a left, or the "brain" of the cell; the nucleolus, the stomach of the cell, where a vegetative process is going on; and the wall, the organ of locomotion, beginning as a process of gaseous propulsion.

If we follow this line of continuity of life, arising in the continual rearrangement of position in gaseous quantities, from the interior of the core of the primal atoms to the final formation of the animal cell-wall, we will find the same process of continuity in the growth of the embryotic human cell. We find the embryo as a cell dividing into two, four, eight, etc., until a definite number has grouped together, when a "membrane" is formed "with an aspect like that of hexagonal pavement epithelium," and, as the change passes toward the centre, the cells, as they form, come toward the membrane and thicken it, leaving a clear liquid within." This stage of embryotic growth shows the formation of the inner core pushing its accumulation of matter to an equal division into two parts from which arise the organs of digestion from the internal layer, and nervous and muscular systems from the external layer; the brain thus arising from the same layer as the organs of locomotion.

The continuity of life is dependent upon the continual displacement of definite quantities of gaseous electricity, as primal groups, moving in different directions and at definite speed. These conditions must govern, and nature's laws must rule, consequences be what they will. By association of wrong grouping in chemical atoms, or a grouping of electric charges making up centres of tension, out of harmony with certain balances, which afford the most agreeable condition regarding man's comfort under climatic conditions, the present condition of temperature results. Disease also is a result of fixed balances in primal groupings being broken down. The chemical activity necessary to re-establish these primal groups in their fixed place in space evidences a condition called disease, but the laws of balance must govern, or else the whole solar system would be destroyed.

These six stages of growth arising in the primal system of 3-4 with its attendant mass of ether provides for the chemical combination of atoms, as groups, from which has arisen the human form.

In the sixth stage we have the numbers (96-128), (48-64), (24-32), (12-16), (6-8), (3-4) and attendant mass of ether.

In the fifth there are (48-64), (24-32), (12-16), (6-8), (3-4) with its mass of ether.

In these two stages we have represented the products repulsed from the fourth accumulation combining with the products grown by the sixth, and given in exchange for those received from the fifth. There is, therefore, all the gaseous electricity surrounding the sixth stage that can balance the whole quantity of gaseous electricity contained in the whole six stages. In other words, the weights of the whole number of atoms are balanced as "an external atmosphere" or gaseous conditions to neutralize the weight of the mass as a whole indivisible stratified sphere. The amount of gas for the oxidation of the carbon atoms is provided for, and this condition is identical with that of the organic cell.

If we look at the numbers contained in the sixth stage, as a first group we find the numbers (96-128) and the following groups are the same as the preceding groups making up the fifth stage of increase. We have consequently a central group containing 96-128 atoms about which will rotate the preceding and succeeding groups as a fixed centre in the future collective process, when the magnetic field is broken down and a rearrangement of quantities of gaseous electricity is building up additional groups. This peculiar condition will actually represent the transmutation of the nucleus of the cell or the core of the atom into a collection of cores, which will govern the accumulation of all atoms or cells arising in future from this primal "parent mass," and will force the turning of the groups to right or left, because these turnings are already implanted in the preceding six stages of growth, and the continual decomposition of these primal values affords a fixed kind of food as "motions" for the new growths.

If we take this central group (96-128) as a point about which succeeding collections will group we will have to find a preparation for the government of the primal system of 3-4 atoms with its mass of ether. If we divide these numbers by 3 and 4 we find there are 32 atoms in each. If we add up the values of the groups preceding and succeeding this central group, we have 93 and 124 to be equally divided amongst the parts of 3-4. This division yields 31 in each part and there are 31 on each side that will act as "food" for each of the groups of 32 in future growths. What does this prophesy?

The direction in which the magnetic fields move are at right angles to those of the electrostatic ones, so that these groups arising will form a perpendicular line as groups of 4 in the central group of 32, and there will be a continual piling up of square plates from this centre of 32 (8 to each increase) and the atoms or cells arising from the 31 pairs will be attached to these squares. This formation portends the formation of the vertebræ with its 31 pairs of spinal nerves.

The spinal nerves are enumerated as eight cervical, twelve dorsal, five lumbar, and six sacral pairs. The cervical pass off to their distribution transversely, the dorsal obliquely, and the lumbar and sacral vertically.

Professor Owen says, "The bones of the skull are metamorphosed vertebræ, four of which appear to have undergone change." The bones of the skull are no more metamorphosed vertebræ than are the primitive rocks "metamorphic rocks." The bones of the skull represent the "occupation of space" by combinations of atomic formations made up of primal groups, thus containing the most infinitiesimal particles to be found in material form, and so the most compact.

The foundations of the earth, or deposition of material which formed the rocks, are found in the same position as described in the direction in which the spinal nerves are found, as transversely, oblique and vertical.

In the grouping of numbers characterizing the vertebræ and spinal nerves we have the primal system of 3-4 with its attendant mass of ether, in six stages of growth under four different electromagnetic combinations. The whole mass is a negative equalization of groups, consisting of 4, 8, 16, because these values must first be grown as an "indivisible magnetic field," before their individuality as "pairs" can be effected through the force of magnetism as "rotating electricity."

The 12 dorsal pairs originate in the magnetic field, grown from the grouping forces of 3, 6, 12 under like magnetic control.

The five lumbar are an equal field, made up of the five different kinds of electric charges between electricity and magnetism, or "rotating electricity" moving in five directions.

The six sacral pairs arising from the three "fields of gaseous electricity" occupying the spaces between the inner core and its shell, the interior of the core and the exterior of the shell. It shows, in its position, the control of the process of internal oxidation, a process that finally brings forth the repulsion of the child from the womb.

We could continue and find an explanation of the whole anatomical construction of the human form, but space does not permit.

We must, however, pause to consider the value of the group of atoms, numbering 128 as a product of the primal 4 of the system 3-4. This group of atomic weight, is that of the ^ atom of radium, and radium could not be formed as an "individualized atom" until the six stages of growths had accomplished their construction of a whole spherically stratified field of gaseous electricity, and this condition could not have been fixed until the whole mass of matter had been rearranged according to these six stages in grouping. The breaking down of the whole would cause the "groups" to become centres of "rotating electricity," and the equalization of groups in the first place would govern the quantity of particles or amount of gaseous electricity in each centre, and the six stages, passing through six different conditions in grouping, would make each group equal in mass as *three* great centres of dynamic energy, continually increasing and decreasing their atomic formations through the values of the static part of 4. This government of the static or the force of magnetism would eventually individualize *four* conditions in grouping. The first three great dynamic centres (as brain of the atom) would bring forth a great mass in continual electrical activity or continual internal radiation. This internal radiation would only be possible by the mass becoming spherically stratified, as "bunching" or groups throughout the sphere. The forcing of the groups to the periphery of the sphere would make each group an external centre, and the mass would be made up of two walls, the inner possessing an atmosphere and the outer possessing an atmosphere. No single atom can exist as such, without the support of surrounding values. This condition of continuous radiation would provide the solar system with its sun. The moon, as the product of the force of magnetism, would represent a centre of external oxidation, or the contraction of the same amount of gaseous electricity into continual "rotating" groups of atomic activities, and her formations as cones, and crater-cones are now explained.

Static part
of the

The earth as a centre where groups of atoms were equally divided between an internal and an external oxidation, or where the "groups" when forced to the periphery of the spherical stratification could maintain a continual exchange of places between the numbers of atoms making up the initial numbers, was a centre which brought forth chemical combinations that could continue for a definite length of time, and the final product of her atomic construction should have been a combination that should have existed as long as the sun could continue. The *stars* are bodies of unequal size, each size governed by the different kinds of groups making up the primal stages of growth of the six conditions of increase.

The radium atom could only exist (in nature) as rays of electricity, because they arise in the continual combustion of changing fields of gaseous electricity generated by the decomposition of internal atoms, occupying critical positions in primal forces in groupings.

The individualization of any atomic construction must depend upon its external fields of gaseous electricity. We do not see this phenomena when external, but when radium was discovered with its great forces of internal oxidation, it was impossible to overlook it. Radium, made up of a system where the static group of four atoms (nelium?) has become transmuted into a dynamic system of six parts furnishes a condition where the decomposition of the primal part is made active throughout the whole mass, and a continual production of groups of atoms are formed, as the gamma or Röntgen rays always accompany the emission of a beta particle or electron, and never appear otherwise; also that it is only in some of the changes that electrons are thrown off.

It is through the properties of the "emanation" that radium must be analyzed. If there are *seven* different kinds of atoms, each equal in mass, there must be seven different kinds of radium atoms, because each atom is made up of a definite quantity of gaseous electricity (as electric charges) moving in definite directions. The decomposition of the groups of atoms into electric charges would bring into opposition many of the charges, and these charges rotating in centres would build up different kinds of substances and Professor Rutherford has isolated *six*, which he has named Radium A, B, C, D, E, F. As we have already shown, there are six stages in the primal fixation of "definite quantities of groups of gaseous electricity," these "groups" continually being condensed into atom and groups of atoms.

The dynamic part of the system, as 3, is in a state of continuous radiation, the static part of 4 being the non-radioactive.

The dynamic part governs the production of an atmosphere about the atom, an atmosphere about the groups of atoms, and an atmosphere about the whole six stages as one indivisible spherical stratification.

There are *three* atmospheres, each of a different constitution, because of the different positions of rotating groups.

As radium is the largest atomic grouping as an indivisible centre when the whole is brought into decomposition, it will possess the power of building up six different kinds of radium atoms, before it has become a balanced system in continuous radiation, and the origin of Radium A, B, C, D, E, F, is explained. As atoms, and groups of atoms, arise in a source of continuous radiation, there must be an "atomic" grouping of the radiation itself, but this grouping will be found in connection with different kinds of minerals. There is, therefore, a dynamic as well as a static form of all matter, and we are forced to inquire, is gold the static form of radium or is radium the dynamic form of water?

Radium is the transmuted or negatively electrified static group of 4 atoms into a dynamic group of 128 atoms; or the 4 static group, passing through six stages of displacement in position in space, has reached a place in the whole field of accumulation which when broken down brings these groups into opposition with the initial 4, when turning in an opposite direction. The groups of 4 are indivisible as a static group of atoms, and this weight is the weight of helium. Now helium is a very inert gas, because it is continually pairing, and being made up of even numbers, as a first or primal group, it will never be brought into opposition with groups of its own kind, until pairing in groups of four begins to take place. The increase of this primal group is as 1, 2, 4, 8, 16, 32, and there will be groups of 4, 8, 16, 32, 64, 128. We find definite forms of bacteria cells grouping 1, 2, 4, 8, and Sir William Dawson found groups of Eozoon containing a collection of cells in a sort of matrix numbering 8. Again, a great many of the early forms of life possessed organs of locomotion, numbering 4, 8, 16, 32, 64, and it goes to show that the distance any animal can move is determined by the amount of energy released in the production of radiations. This amount of energy is "stored up" in a form of static electricity, but its expanse must produce the same quantity of radiation that is bound up as static. To this phenomena we must place the origin of temperature, and it proves the temperature of the earth to have been the result of a slow process of accumulation of energy as "static electricity" and the first condition of temperature must have been low because of its equal distribution in minute particles.

When the whole stage of growth, represented in these six stages, had exhausted its atomic groupings throughout the whole mass of gaseous electricity throughout space, its spherical stratification would make the whole mass one great globe of primal atoms floating in ether.

The largest collection of atoms (128) would form the beginning of a planet as a centre containing definite quantities of radiating atoms. Now the equal condition of each of the seven primal atoms would make each centre equal in mass and the division would be four masses of equal radiation held as "static," because no amount of energy can be individualized until it has become part as a "centre" in a magnetic field of force, or an "electrostatic field." When this magnetic condition is broken down, each static part, no matter how infinitesimal or how large, becomes either an individual atom or a group of atoms, and the different kinds of groups will afford material for a continuous production of radiation under definite conditions.

The four great centres held as a static group of four by the gaseous electricity as an atmosphere would be forced to separate by the atmosphere itself forming in two opposite directions; this being the result of pairs of atoms moving in opposite directions because of the change in the orbital path of the electron and the charges, forcing the pairing to move in opposite directions. The dynamic part of the primal atom has now forced its activity from the centre to the circumferences of the spherical stratification, and the two atmospheres brought into opposition were those originating in the two opposite streams between the core and the shell of the primal atom. The atomic values represented in the two opposite streams making up the wall of the core, and the two streams making up the shell around the core, have become equally distributed into four parts, and the core has become "paired cores," and the shell "paired shells" in atomic values in multiplication.

The separating force as shown by Sir Oliver Lodge being at right angles (produced by the force of magnetism) to electrostatic lines of force, will bring about four different conditions in these "paired cores" and "paired shells," governing the manner in which the radiations will group to form centres of force in the grouping of electric charges, and atoms, built up as a "separating force between these four values or "group of centres" of radiating matter. The only way (in nature) to separate her combinations is to force a growth that will fill the space between the parts to be separated. Space is filled with its particular kind of filling throughout its length and breadth, and such a condition must be recognized before control of "creation" can be discovered.

The atomic combinations produced by this third "separating mass of gaseous electricity" is the mass of gaseous electricity that now keeps the planets in their particular places in space.

We have already shown, while describing the method of increase in six stages of primeval grouping, how the wall of the inner core and the shell became increased to the final condensation of the three atmospheres, occupying space within the core, between the core and shell, and around the external part of the shell, as the nucleus, the nucleolus, and cell-wall, in the animal cell as the highest evolutionary stage of the individual cell, and we find that the same continual displacement of "groups" of gaseous electricity, as electric charges, has brought forth the group of four great centres of radiations, which will for all time be held in place by the atomic combinations arising in the constructions of this third atmosphere, and forcing the condensation of the mass in each part, according to the electro-magnetic laws governing electrical force.

These pairs of cores and pairs of shells possess different characteristics because of the direction in which the primal set of atoms were moving. The core, as an individual centre of activity, received food from the products repulsed from the shell, and the shell took in return products repulsed from the core, these products arising in the core eventually showing a force of repulsion or propulsion, as organs of locomotion; the explanation being the continual production of material along a definite line of increase and decomposition, as groups breaking down into smaller groups, until the charges themselves break up into gaseous electricity. This continuous line of attachment from the group to the individual electron keeps the occupation of space, and the organs of locomotion are nothing more than this process of breaking down of chemical grouping into primal parts.

As there are only two conditions of "push," or a force moving towards a centre (or core) and one from that centre, the one originating in the centre as a primal "group" is the force that governs the quantity of matter that shall become a spherical mass. We have shown the core to be the "brain" of the atom, so that the two cores will be a sort of brain, each taking part in governing the manner in which atoms shall group to form centres of force, wihch will eventually bring forth solids, liquids and gases.

One will govern the direction and speed at which atoms will move, and the other the number of atoms that will form into groups, and the manner in which these groups will arrange themselves.

The pair of shells possess different characteristics also, and we will find their differences in the atomic combinations making up the shell of the atom or wall of the cell.

The shell took from the core its products of combustion, and in turn passed them out as organs of locomotion, or propulsion; but taking in return from the surrounding atmosphere of gaseous electricity the primal charges of electricity as a food, or a definite quantity of gaseous electricity that would fill the space left by the charges taken from the wall by the core. There would be a force of splitting up the whole into parts, representing the different groups, in size, that would arise during the establishment of the great mass of radiating charges as a spherical stratification containing four centres. The collecting force originating in the centre of the core, and multiplying by feeding from the breaking down of the atomic grouping of the shell, would hold the whole mass as a great radiating centre, because of the single atom in the primal group of 3-4, when pairing was taking place. This would be continually breaking up the growth of pairs, and the atomic groupings could not increase beyond the stage of growth represented in the six stages, and during the rearrangement which made the whole a radiating [illegible]

The second [illegible] would, as a shell, split up into innumerable parts which would [illegible] condense beyond the same condition as that of its mate, and the origin of "nebulous" masses would be explained.

The great mass of radiating atoms would give us our sun, the paired cores would separate as the moon and the earth.

The atomic formations of the moon would govern the direction and speed at which atoms should move, and the earth would act as a centre of condensation, governed by definite numbers in the grouping of individual atoms. The stars are, therefore, equal to the mass of the sun, each star being equal in mass to the mass of a part of the whole sun, as different groups of atoms acting as centres of force around its circumference. As the shell took from the atomosphere gaseous electricity to occupy the space of the charges taken up by the core of the atom, so the sun must take from the earth, under government of the moon, gaseous electricity to occupy the space from which the radiations are projected into surrounding space. The sun-rays, acting as life-giving force, are giving to the earth no more than it receives from it.

The moon appears as a centre of distribution of electric charges passing to the earth from the sun and passing from the earth through the moon to the sun. This course of direction in motions carrying gaseous electricity in definite masses could only be possible by the continual growth and decomposition of primal groups into infinitesimal masses of gaseous electricity. Space is filled, and electricity can only travel as representing broken-down fields of gaseous electricity or ether, as a magnetic field, and each part of the field becomes "rotating" electricity. The circles made by the rotating action no doubt form the electrons, and the electrons form the charges of electricity, and the charges form the currents, but space is filled with different conditions known as "condensation" of gaseous electricity or ether, and this condition must be recognized before control of life is obtained.

If the sun and the stars are radiating masses they must be hollow spheres filled with gas, the grouping of atoms into centres forming on the circumference of the sphere. This would explain the origin of "sun-spots," and their relation to magnetic storms on the earth.

The moon must also be a hollow sphere, and as a great magnetic body her formations are all spherical, or cones and crater cones.

The earth, being a union of the atomic groupings of the sun and the moon, would possess the power to keep her atoms in continual displacement, and liquids, solids and gases would continue equal in construction and decomposition. The earth is the womb of the Mother Moon, and the sun is the male element of creative force.

During the separation of the four into individual centres, no doubt Eozoon Canadense was being deposited as chemical constructions. The failure of man to recognize Eozoon as an animal growth is because he failed to recognize the internal oxidation as the water which glowed through the tubuli.

If we had space, we could show the condition of the earth as a globe of water as an external covering for the foundation of the earth. We do not think further explanation of the origin of chemical substances and of the organic cell is necessary.

We could also if necessary show the origin of the weight of every chemical substance from the primal stage of the six forms of increase, during their equalization as groups in primal formations. What was formed as a basis for all future growths must be in course of continual formations, so that the spontaneous generation of life, although not spontaneous in the real sense of the word, must be going on continually, in the world of the infinitesimal. If it were not so, man could not continue to live because of his transgression of the laws of perfect chemical combinations, in force in the beginning of life. There must be a form of life in the infinitesimal, that will represent the smallest cells and groups of cells in the human form, or the atmosphere would become a liquid, or a solid.

We are in the habit of speaking of the earth as the infinitesimal in comparison with the sun, but we must look to the gaseous electricity occupying space, or ninety-three millions of miles, as belonging to the earth and moon almost entirely, because they, as a mass, condensed, while the mass of the sun did not condense.

There are two positions in the six stages of growth, at the beginning of the fourth, where we find the group (24-32) and the beginning of the sixth stage where the group (96-128) shows conditions, where the grouping of four parts takes place in both the dynamic and static part, as three 8's and four 8's, and at the second place three 32's and four 32's; and at these two places we find the commencement of the turnings that finally brought forth the sun, stars, moon and earth. It can easily be worked out by anyone desiring to do so.

Sir Oliver Lodge says, "Two substances placed in intimate contact and separated are in general united more or less permanently by lines of force, the region between them being in a state of tension along the lines and of pressure at right angles. These lines have directions and 'sense'—their two ends are not alike; they begin at one body and end at another, they map out a field of electrostatic force, and their terminations on one or other of the bodies constitute what we call an electric charge. Electric charges are of two kinds, positive and negative, the former corresponding to the beginning of the lines, the latter to their ends. A tension in the lines tends to bring the ends toegther as near as possible, while laterally the lines tend to drive each other apart."

Such a description of electric force explains the intimate relation of the earth, sun, moon and stars.

The positive charges, arising in one body and ending in the other as negative charges, prove that the positive charges are products of decomposition of groups of charges, and as they travel from one body to another, they can only do so by leaving the space through which they pass filled with gaseous electricity. As they reach the other body they are broken up into individual electrons, because charges cannot travel without producing a "growth" or forcing the ether through which they pass to group in definite masses.

When positive charges pass from the earth to the moon, their indivisible construction is broken up, and before the moon can receive them they are broken down into groups of gaseous electricity. The moon rearranges the mass as groups or positive charges, and before they reach the sun they are broken down into equal masses as negative electrons and the sun absorbs them, forces their grouping as radiant masses and sends them back to the moon under the same laws of electro-magnetic construction. No form of matter can take gaseous electricity into its body except the union commence at the point of decomposition of the electron into primal ether. That is why the cilia are present in the human body. The cilia provide the gaseous form of matter, to combine with the breath, and cilia are always moistened surfaces, because water is the first substance formed in a changing field of gaseous electricity or ether.

No explanation has ever been found of the part that the ciliary construction plays in the animal body, but is it now explained?

The forces which are causing the moon to describe a serpentine path in the heavens are described as "a tension in the lines which tends to bring the ends together as near as possible, while laterally the lines tend to drive each other apart."

The earth is continually expanding and contracting, because of the continual changing of the fields of ether or gaseous electricity passing from the circumference to the internal part and back again. All atoms are "floating" in ether, and this ether is continually making up charges of electricity, and as "rotating" centres it forces the expansion of the earth at definite periods of time. This phenomena is spoken of as the tides, and as the same atomic combinations are present in the moon, we have ascribed to that planet the cause of the tides. All causes of any phenomena must be looked for at the infinitesimal point of motion, and not at their "consummation of accumulation." The earth is as much animal in her construction as is man, and the earth breathes, and that breath is forced through her by the condition of gases occupying space, and all volcanoes are caused by "centres of radiating combinations breaking forth into radio-active propulsion at definite periods of time and at definite places on the earth's surface.

We must not forget that the origin of the sun, moon, earth and stars was centred in one indivisible mass, and if the sun shows centres of explosive nature in sun-spots, the earth shows the same explosive force in volcanoes, etc.

The origin of meteorites and aerolites is a mystery, but their atomic construction shows their formation through the accumulation of centres in the atmospheres as three different conditions of atomic grouping. The third atomic grouping, which separated the group of four great radiating centres into the sun, moon, earth, and stars, holds primal groupings, and in their occupation of space arise the electric charges that pass to the sun, or to the earth, or to the moon. Space must be kept occupied by centres of tension, and when these centres reach their critical balance, if they all combine to form solids, there will be very hard substances formed, because of the infinitesimal size of primal particles. If the whole field breaks up into primal groups, gases alone will be liberated. This phenomena is the regular condition, but there must be times when a field of such atomic groupings will combine as a whole indivisible group, and the origin of meteors and aerolites must be looked for in that part of the heavens.

The different elements found in aerolites are given as follows: silica, alumina, mgnesia, lime, oxide of iron, oxide of manganese, potash, soda, sulphur, iron, nickel and chromium—twelve different chemical bodies. We find the weights of each of these substances contained in the primal grouping of the first six stages in accumulation of atoms into groups. As there were seven different kinds of atoms from which these groups arose, each of equal weight, their differences arising from the kind of electric charge that provided food for the growth of the atom in its process of decomposition, there would also be seven different conditions or groupings of these six stages, and it would be in the decomposition of the groups into primal quantities of gaseous electricity that minerals would be formed as definite groups in atomic accumulation. These new formations would also show why different elements are always associated in masses in the earth.

Of the number of aerolites analyzed, and given as examples of their composition, the number of different elements in their individual composition are 7, 8, 8, 11, 4, 7. The explanation is their origin as parts of a magnetic field in the atmosphere as a point of internal stratification, because if it had been internal and external, nothing but gaseous electricity would have been liberated.

As the primal grouping of atoms consist of 3-4 and its attendant mass of ether, this static group of 4 must enter into the composition of every element formed, and we must look to the pairing of this group to explain the numbers that make up atomic groupings.

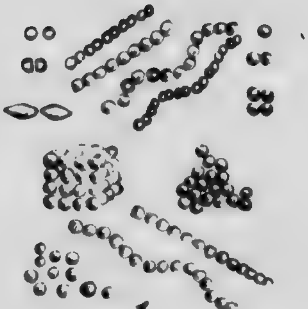
The weight of silicon is 28, and its origin must be traced to the pairing of the fours in 16, and 12, or three 4's and four 4's, or seven in all. This combination would make silicon possess three different conditions, because of its growth through the dynamic as well as the static part of the primal system. It would arise as a growth of the first three stages, as (3-4), (6-8), (3-4) and mass of ether, and before it became static in the whole field, would go through three processes of groupings, yet each process would make an atom of silicon. The third process would be equal to a negative electrified force and the brilliant plates which form one of its conditions would thus be explained. The fact that silica constitutes the principal portions of most of the hard stones and minerals which compose the crust of the globe, is a proof of the correctness of this system of (3-4) with its mass of ether, because at this third stage of increase, the whole mass of matter would have to yield this substance as its outer formations, because of its position in decomposition and reconstruction, in the primal system of grouping. Silicon as a primal formation would be associated with water, and its condition as silica would arise because of the decomposition of the water atom supplying a source of "food." It would thus receive its association with oxygen from that element's presence in the water atom or water cell, as H_2O. The reason that the crust of the earth was formed of silicates of alumina, lithia, potash, lime, etc., is because the decomposition of the water-cell liberated pairs of 4's, which when being reconstructed would make up a new centre of force. Water, as a spherical stratification in the new growths, arising from the second increase, containing (3-4), with its mass of ether, (6-8), (3-4), with its mass of ether, would actually be a living one-walled cell, because this stage would have to pass through three stages of displacement of atoms before it became balanced throughout its parts. The two masses of ether in the new growths would become rotating fields of ether, and the walls would be made up of four groups of four atoms in each group, the final evolution of which brought forth the four great centres of radiating charges, which laid the foundations for the sun, moon, earth and stars.

The cell formation of water explains the origin of "internal oxidation." This primal growth of atoms, spherically stratified, as a wall enclosing two rotating masses of primeval ether, in opposite directions, the wall being formed after the same manner as the atom itself, as masses of rotating charges at different points of the sphere, when these charges as "groups" making up the wall grew to the point of critical change, the parts would decompose into crystalline particles or groups of static form, and these crystals would be carried by the rotating charges as bones for the new accumulations. These "bones" laid the foundations of the earth, and water as a living cell makes Eozoon Canadense an animal formation, its internal oxidation showing as currents of water in the tubuli.

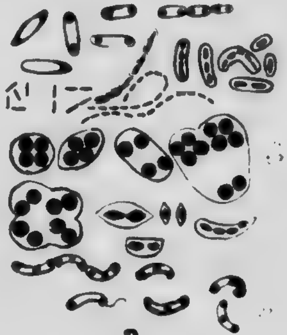
As the physicist has directed attention to the possible solution of the origin of life in the electrical constitution of matter, the assertion that life is a result of mere chemical affinity is not borne out, because all forms of matter owe their construction to a great law of balance working out through the whole mass of matter occupying space.

The "survival of the fittest" is not an explanation of the continuance of certain species of life, but this continuance depends on the length of time such a group of "gaseous electricity" in all stages of motion can hold its position in certain places in space, or the point as a field of force, of either large or small dimensions, making up the whole gaseous envelope of the earth.

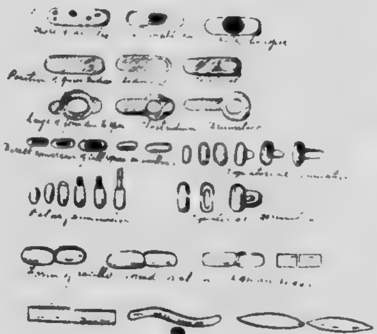
Believing that a sufficient explanation has been given of the origin of the elements and of cell life, we will now pass on to the explanation of the illustration of plates 1, 2, 4, 16, where we will find the same indivisible chain linking the formation of man with that of Eozoon Canadense, and prove that man did not descend from a single cell, but from a combination of 3-4 atoms, with its breath of life apportioned to it, and that breath of life has increased as the combinations increased. That by this "breath of life" alone has man descended to the earth, and his atomic construction was determined when the primal system of 3-4 atoms with their mass of ether became a brain and a body that could work out a final condition of temperature, where he could live without the consciousness that he was "alone."



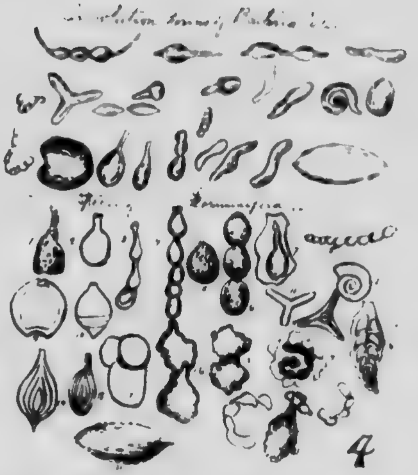
1



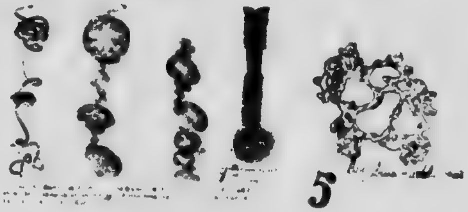
2



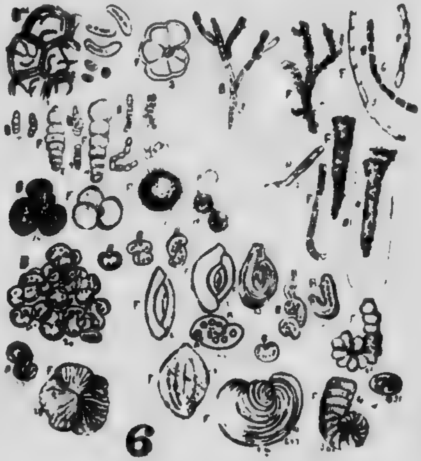
3



4



5



6

Plate 1

Explanation of Plates

PLATE I

As bacteria are said to hold the balance of life in the earth, and that life a representative of definite accumulations of motions carrying matter, we must understand the meaning of the different ways in which bacteria cells group together as indivisible numbers, in their multiplication as forms of cell growths.

The bacteriologist has studied the phenomena attending the growth of bacteria from a pathological standpoint alone. The significance of the numbers forming groups has been noted only as a means of identification of species.

The meaning of their increase by "fission" is a mystery, that form of reproduction inexplicable. The bacteriologist says bacteria increase by fission but they "reproduce their kind by sporulation." This is a distinction without a difference, because, in the case of sporulation, the non-formation of spores is dependent upon the elimination of waste products. Novy says, "As long as the organism is growing under the best possible conditions it will not give rise to spores."

Involution forms and spore formation are dependent upon the reflex action of the products generated by the activity of the cells. The spores are the individual or negatively separated "groups" while involution forms are the collective or positively connected "groups" making up an unlike form from that to which they owe their being.

Bacteria cells can only be understood in their manner of grouping by investigating their accumulation as spherical cells or micrococci. The spherical cells group in numbers as individual, paired groups of 4, of 8, and squares of those numbers. They form chains containing the same numbers. Some of the chains are straight lines while others are serpentine. They also form as "grape-like" bunching. Figure (1) displays these specimens. The horizontal and the vertical, as well as the oblique lines of force are evident in their groupings.

The "slimy substance" which holds the cells together is as much a part of the body of the group as are the cells which compose it. It is their "skin," because external conditions in any living form is the product of a condition in condensation representing primal accumulation of chemical combinations, and the skin is only perfected when it becomes a "breathing cell," as a 'lung." The breathing apparatus of bacteria cells is hidden in the production of the one-walled water cell, and that is why bacteria constructs solids from liquids, and reduces solids to liquids. Of course they go further and reduce the liquid to gas, but they possess the power to reconstruct the gas as centres of individual activity as "fields of gaseous electricity."

Micrococci (Fig. 1) do not form spores, because the cell contents and the cell wall are each part of the other, as a centre of inhalation and exhalation. Half of the wall goes over to half of the nucleus and half of the nucleus passes to half of the wall; part of each decomposes into gas and in the decomposition a force at right angles is brought into play and the reconstruction of this gas brings about the separation of the whole into two parts, each part possessing the same characteristic as the parents, or the nucleus and the wall. The continued division can only take place a definite number of times, because of the number of motions held in the chemical substances taking part in the interchange of occupation of space in fields of ether making up one magnetic centre. This is why they are found to group in definite numbers, and in definite positions. The phenomena attending increase by fission will explain the greatest mystery now confronting the biologist regarding the meaning of the separation of part of the ovum and part of the sperm before fertilization takes place. The biologist says these parts are "lost," or atrophies. Now before any two cells can unite they must pass to that union through the union of the primal combinations in atomic groupings, and this can only be accomplished through the decomposition of part of each cell into primal ether, or a union of the breath of life of each cell or nucleus. There cannot be four breaths of life, so that the four conditions, as inhalation and exhalation in each, as male and female, must be readjusted at the point of decomposition into primal ether, and the result is a process of two individual fields of gaseous electricity, made up of definite quantities travelling in definite directions, revolving about each other, and the process as internal oxidation is there commenced, as the initial stage in the growth of a new being. The growth does not commence at the time of entrance of the sperm into the ovum, but at the point of decomposition of the chemical groups into primal quantities of gaseous electricity. The two parts are thus "pushed" together, and the same forces at work in pushing the sperm and ovum together as one indivisible group, will, when all the different motions have been effected that can take place in a field of ether occupying a definite position in space under a definite temperature, push the perfected form from the centre of growth (the womb). We must not forget that temperature is a result of accumulation of energy stored up as "groups" of atoms or groups of electric charges holding a definite position in space. Both male and female properties are held in the spherical bacteria cell, and the union of one with that of the other can only take place by the equal division of part of each into a new combination of gaseous electricity.

This phenomenon of fission explains the meaning of "parthenogenesis," a phenomenon that is now holding the attention of the science of physiology. The part played in the production of life is not confined to form, but to a conditions of motions arising in the groupings of primal quantities of gaseous electricity, under the process of decomposition of that already occupying position in space. The union of certain fields of this gaseous electricity, as a process of internal oxidation, will bring forth a definite form of life irrespective of the parental form, under definite laws governing the growth of the water-cell.

We have this statement proven in the production of involution-forms by bacteria, shown as Figure (4). Novy says, "Under unfavorable conditions of soil or temperature certain bacteria will show remarkable variation from the normal type. What is ordinarily a perfect rod becomes distorted out of all resemblance to the original form. These peculiar, deformed cells are considered as degenerations. Transplantation to a favorable medium will promptly restore the typical form. The alterations are the result of environment, etc."

This explanation of the cause of involution-forms is scarcely in accord with extended observations connected with bacterial growths. All rod-shaped cells do not show involution-forms. The rods are actually the male and female cells "pushed" a definite distance from each other. This is shown by a process of staining. Note the different grouping shown on Figure (2). The rods show different conditions in grouping—we have single rods in a capsule, paired rods, and we have them as a homogeneous or solid mass in numbers of 1, 2, 3, 4, 5. They group in squares and in paired squares. There are all the numbers shown that are found to characterize the grouping of the spheres.

The whole process of accumulation in matter is shown to take place by the action of occupation of space by the substance beginning in the changing fields of ether brought forth by decomposition. The construction of form is the result of a continual separation of parts, the separating substance occupying the space of separation. The spherical cell multiplies, therefore, in three different ways, by fission, by sporulation, and as involution-forms. The condition as a multiplication is hidden in the single spore and in the single form as involution-forms, but if we speak of forms of life resulting from an accumulation of cells, we must recognize spores and involution-forms to be a form arising from a multiplication of spheres. Half of the matter must decompose into primal ether in order to provide a united breath of life, and we cannot say this part atrophies in the light of the slimy substance always present in bacteria cultures. This slime is their connecting tissue.

The Rods are the cells that produce involution-forms, and we must look to the same place for an explanation of their origin as we find displayed in the mysterious "maturation" process before the fertilization of the ovum.

We have already shown the fertilization to begin at the place of transposition of the "breath of life" of the two parts of the nucleus cast off by the ovum and sperm, and that the two parts remaining are pushed together by the reconstruction of the matter repulsed from the two parts, devouring the substance in which the cells lay, the rods being actually the result of a process of separating substance, making the wall and the contents two individuals, or a male and female. When the two cells are forced together by the separation of the parts into opposite movements, new forms must be the product of this union. The part of the cell that decomposes into primal ether is the part that is forced to move in an opposite direction, and the changing fields of ether produce a change in the path of electrons, and also bring into opposition electric charges which produce radiations. Now the great question before the physicist is, *what is the meaning of sex?* We have that question answered in the recognition that sex is the result of an occupation of space by two rotating fields of ether moving in opposite directions. Their contact will force a change of path in their groupings as electrons and as electric charges, and thus all forms of life will have their conception "in a flame," or in the midst of a field of luminiferous ether.

Sir Oliver Lodge says, the only way to produce radiation is by forcing a change in the orbital path of electrons, also by the retardation and acceleration of electric charges.

These two rotating fields of ether are made up of a definite number of parts as groups of electrons, and of electric charges. The female field is an indivisible collection, the collecting forces moving to a centre. The male is a field constantly breaking up its mass into parts, each part representing the same number as a group, a number of which makes up the female field. The number and kinds of groups in each field are equal; one is a centre of condensation, the other a centre of decomposition.

We thus see the meaning of *sex*. The continuous production of light brought forth the different forms of matter and of life, and the continuance of light is dependent upon the continuance of reproduction of *sex*.

Is it not evident that the final product of light must be a creature that will ensure a continuous luminosity through its cell activities, as a reflex action of those primal groups that brought forth the creature as a product of light?

The female form of a field of ether, containing all that is found in the male field as a force of separation, must have been the centre for the collection of charges as forms of matter, in which new forms of life arose. The groups of charges would be constantly increasing in numbers, and the balance would not be perfected until the whole mass of matter had undergone a change of motion. The new forms of life would possess a mother in solids as matter, but a father in groups of luminiferous ether. The water-cell must have been a female cell, and the field of ether surrounding that cell the male, or decomposition force.

As material forms arose from the production of radiations, radioactive atoms must have been forced into a static position, as a magnetic field of electric charges. This primal system of 3-4 atoms with its attendant mass of ether would represent the male decomposition force as three dynamic atoms, and the female collection as four static atoms. As these four static atoms are products of radiating forces, they must be equal to the helium atom, for they represent the weight of that atom. That atom is formed while radium is undergoing decomposition, or changing the positions of the fields of male and female groups of ether that enter into the atomic construction of radium.

Each group in the male field would bring forth a different form of life, and the number and kinds of life were determined when the difference in fields of rotating ether was accomplished, in the continuous production of light.

The fixed system of 3-4, with its mass of ether, would appear to be unequal as a male and female, but the fourth value of an atom is held as the ether, in the attendant mass. There must be a condition of ether, of electrons, of electric charges, and of equal number of charges making up the neutral atom. So there are actually four atoms in the dynamic part of the system.

The meaning of involution-forms as a colonial form of life, which is shown so well in the animal forms called hydra, proves their presence to be a fixed stage in the process of "life building," and not a result of degeneracy.

If we compare the pictures of involution-forms, and of certain species of the Foraminifera, we find the same numbers in grouping, and the same shape in form. Each stage in the ascension of life must possess individual species that will resemble those of a lower form, because of the primal groups making up the beginning and the end of the readjustment of position in primal fields of ether occupying space.

As the principles of organic chemistry have been traced to their origin as rotating fields of ether within a circumscribed position, we must ever look to the action of gaseous electricity, as centres of force, for an explanation of internal oxidation as a principle involved in the production of vital processes or the creation of life.

In explanation of the remaining illustrations of living things, we show on Figure (3) the manner in which spores form and the position in the parent cell. There are the polar germination and the equatorial germination, or the vertical and horizontal lines of force in evidence.

On Figure (5) we show bacterial growths as a long, twisted filament, which looks like the twistings seen in the picture of the sudoriparous gland. This filament breaks down into rods, and finally into spherical cells. On the same figure we show a picture of Bathybius Haeckelii (Huxley), a Moneron, one of a class from which Haeckel traces the descent of man. He describes this animal form as homogeneous in all its parts, but if we notice the different sizes of the vacuoles we will see a difference in the expansion of gases as its breath of life. These Monera perform all the activities known as nutrition, sensation, reproduction and movement, so that they are creatures as colonies made up of all the different kinds of groups which could arise through the continuous production of light throughout a given field of gaseous electricity, as a magnetic field of force. The forms of the vacuoles are the shape of bacterial growths, and may be described as bacteria cells decomposed into primal gaseous electricity.

Figure (6) shows the resemblance in form of many bacteria colonies, and individual species of the Foraminifera. The bacteria formations are opposite in arrangement to that of the Foraminifera, or a turning to the right and to the left making a difference in species. The bacterial formations are marked as B, and the Foraminifera as F. The evidence of the constructions as "rotating" forces is very evident.

PLATE 2

In Figures (1) and (2) we have compared the formations of positive dust particles, and a bacteria colony, Bacillus radiatus; Figures (5) and (6) negative dust particles, and a bacteria colony; Figures (4) and (7) show photographs of an electric current passing along a wire, and a growth of bacteria.

In Figure (3) a drop of human blood shows the same arrangement of blood cells as described by Lodge as part of the phenomena attending experiments with the vacuum tube. He says after the positive column fills the whole tube it gradually loses its bright red or crimson tint, and breaks up into a number of very narrow discs, like pennies seen edgeways."

The phenomenon attending the vacuum tube affords a perfect picture of the primordial grouping of electric charges, which made up groups in a field of force, the field representing the different kinds of charges, in the capacity of "food" for the "rotating charges," as fields of ether in continual change of places. There would be as many different centres as there were different kinds of charges. The "dark space" is the space in which new fields of ether are collecting, and the light can only be produced when the parts of the fields are brought into opposition. The two shells give us the inner core and outer shell of the atom, and the two dark spaces the two atmospheres. The phosphorescent glow arises from the decomposition of the inner core of the atom, and there must be different cores in decomposition, because they must release different kinds of fields of ether, or gaseous electricity, travelling in opposite directions.

It can all be worked out with ease when we know the place in atomic activity occupied by a "field of force" as a system of balance between different kinds of electric charges, making up a definite number of the same kind of atoms.

In Figures (9) and (10) we have two bacterial growths, showing the arrangement of a growth superposed upon another accumulation, and in Figure 9 we have a beautiful illustration of the defini-

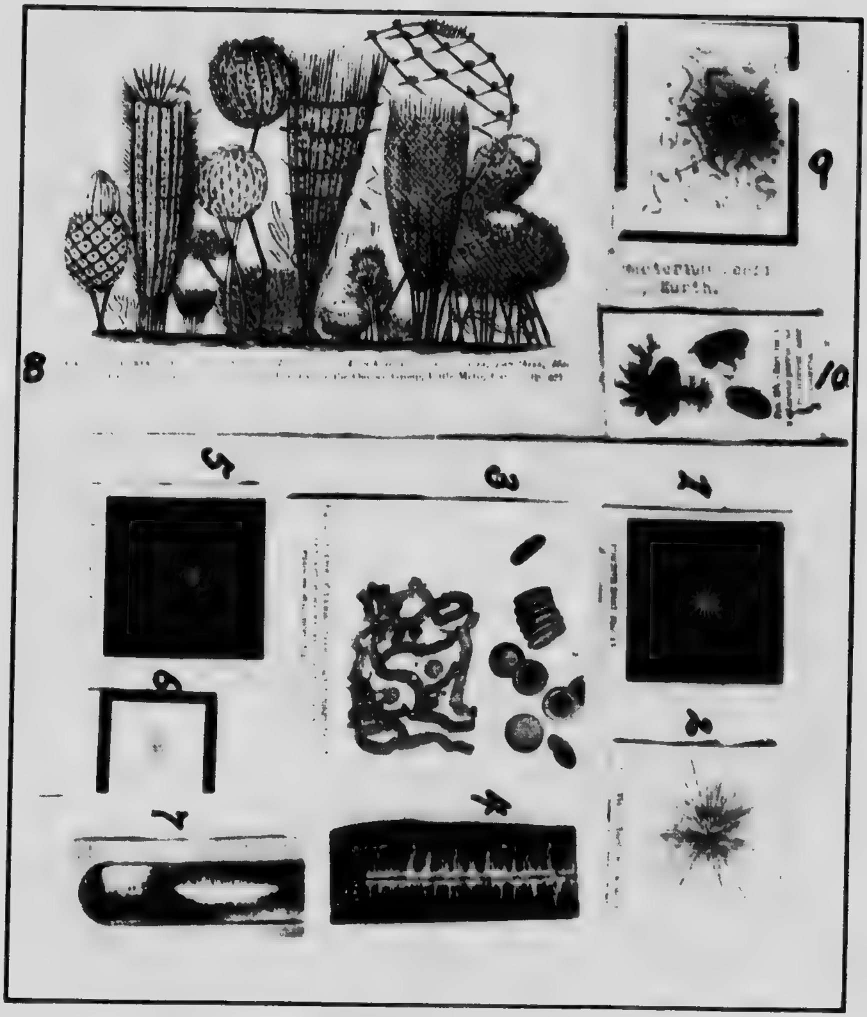


Plate 2

THE UNIVERSITY OF ALBERTA

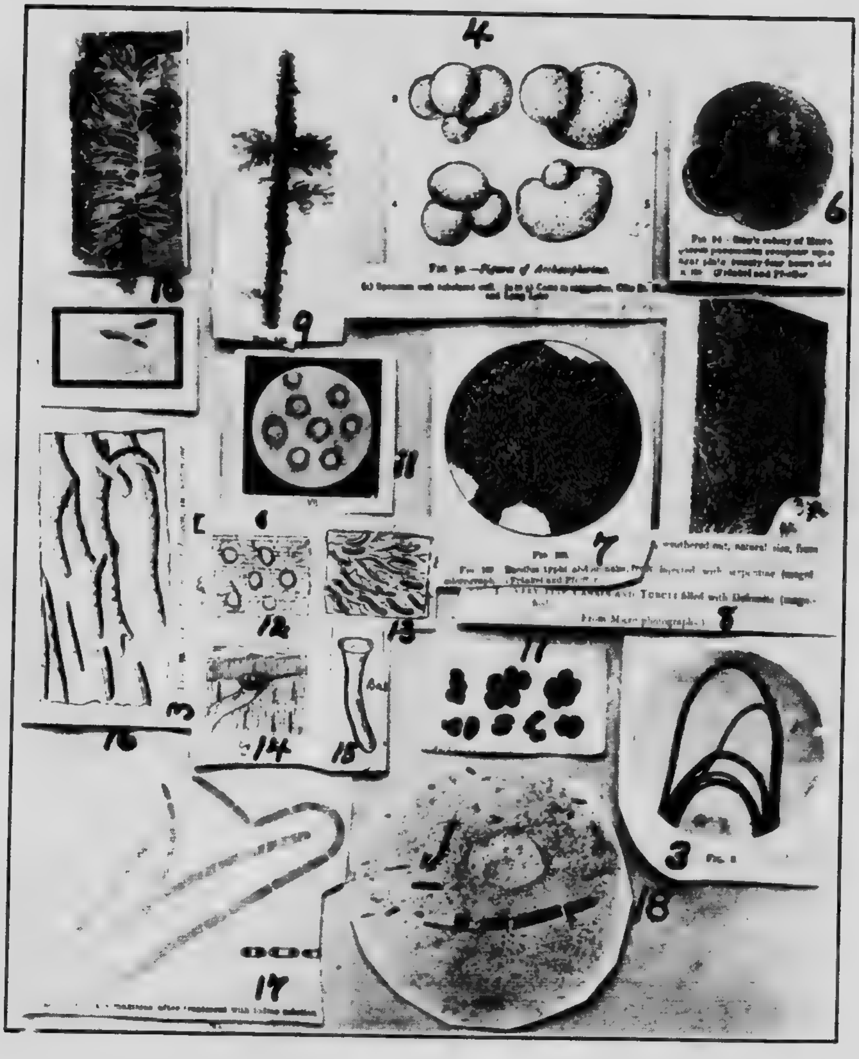

4
6
10
9
Fig. 92.—Figures of Archaeospherina.
11
7
5
weathered out, natural size, from
From Micro-photographs.
12
13
14
15
16
11
8
3
1
2
18
17

Plate 4

tion given by Lodge, of a uniform charge in motion. He says, "While the charge is moving at constant speed (growth would represent the same force of accumulation of charges) the current is steady, and we have a steady magnetic field superposed upon a steadily moving electric field," etc. Electric lines of force are straight lines, and we see the lines radiating from a centre, and the curved and circular rings growing upon the straight lines.

In Figure (8) we have the picture of the first forms of sponge growths, and we find the same directions in formation of lines as "magnetic lines of force which form at right angles to those of the electrostatic lines. In the sponges we have the three different directions in which the spinal nerves are found in the human body, as transverse, oblique, and vertical. The lines of growth on these sponges show their protoplasmic origin as "seafoam" or in bubbles as a water-cell filled with gas crystallized into lines as "fibrilla, and a network."

PLATE 4

This plate shows specimens of growth characteristic of Eozoon Canadense, bacteria (17) and a formation of iron ore, sawn through the piece of rock (18). Number (9) is bacterial growth forming at right angles along a vertical line. Number (10) a growth of Eozoon, showing the same direction of growth. Figures (5) and (6) show growths of Archæospherina and a bacterial formation. Numbers (10) and (16) are forms of growth of bacteria and Eozoon. Figures (14) and (15) are Eozoon and bacteria, but turning in an opposite direction. (11) and (12) are pictures of bacteria and Eozoon. Figures (7) and (8) are a colony of bacteria (after staining) and a specimen of Eozoon. The directions in which the rod-shaped cells lie in the bacteria colony only show a definite arrangement, and a definite number in each direction. The influence of the staining agent would interfere with a grouping in primal groups in a steady succession, but they would group according to chemical combinations resulting from union with the substance used in staining. The cells are "pushed" in definite positions, because the stain could only enter through the primal or single field of gaseous electricity. The part of a bacteria colony that will not take the stain is in the "magnetic" field, because it is already occupying its position as a balanced filling of space.

The resemblance between Eozoon and bacteria must be explained in the laws of growth beginning at the point of decomposition of parts into primal groups. The external must show this primal marking.

PLATE 16

On this plate are grouped the outlines of a bacteria colony (1), the skull of the European (3), the negro (7), and the magnetic pole of the earth, of the northern meridian on lines of equal dip.

The magnetic pole, in its line or closed circle, shows exactly the same outline as that governing the skull of the European, as we have shown, the individualization of form has arisen through the process of decomposition of a whole magnetic field of matter, or gaseous electricity, each part being made up of a group of atoms, which, as rotating electricity (magnetism) formed a stable group which we recognize as a "solid" when the whole field was broken down, and brought under the force of crystallization or stability.

If man was the final product of atomic grouping, and is in the microcism of the macrocosm (the earth), he must show his parentage in the formation of the lines of force that formed the inner core of the primal atom as the brain of the atom, and the final groupings that determined the formation of the cell possessing an entrance into a new position in space, above and beyond all that occupied before his magnetic field of gaseous electricity was formed as a new strata in the atmosphere. This new strata being "pushed" ahead of all others, it in turn would govern all that held the intervening space between it and the earth. All groups would be forced into decomposition, to afford a food for its descent to the earth, and all paths marked out by its exhalation must keep the way for the exit of the final ray that should be pushed from the earthly shell.

This picture of a bacteria colony affords a fine illustration of the meaning of different centres, arising from the same fundamental properties. This colony arose from a mass of jelly of equal solidity, yet we see the different forms of the individual colonies, and the difference in their size. It is probable that we have all the different organs in the animal body represented in this growth. It gives a fair idea of the formation of the sun and planets, the unstained parts being a sort of atmosphere.

In Number (4) we have the picture of the outline of Nautilus Pompilius, and the outlines fit exactly over the outline of the human skull cut across the jaws. The nervous system of this mollusc is at the same place as those of the ears in the skull. Motions, as electric charges carrying matter, are fixed, and whenever a combination of these motions are used as food, under a process of decomposition, the same outlines must form. This is why Darwin's theory of evolution received such support from investigation. The deductions are not warranted as a condition of might, but as a result of the occupation of space by atomic groups, preserving that occupation for a definite length of time.

The picture shown (8), as a weathered specimen of Eozoon Canadense, must forever silence those who declare Eozoon not an animal formation.

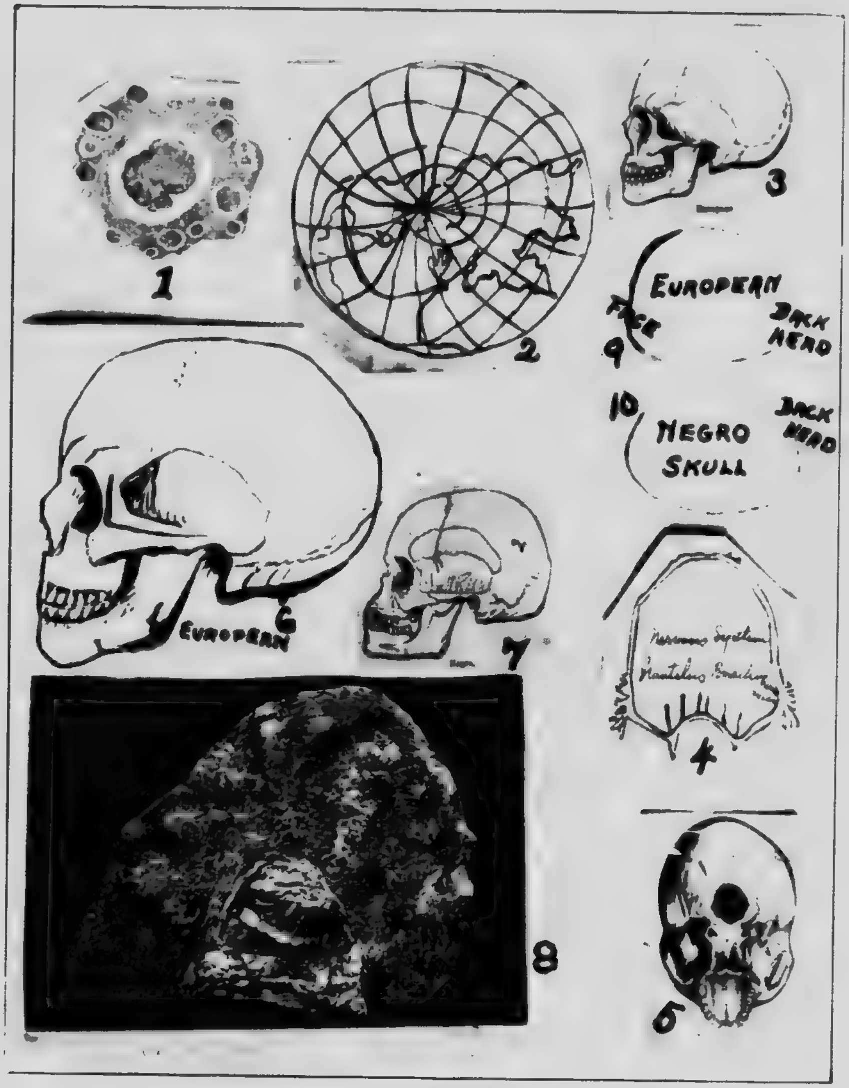

1
2
3
EUROPEAN
FACE
BACK HEAD
9
10
NEGRO SKULL
BACK HEAD
Nervous System
Nutritive Breathing
4
6
EUROPEAN
7
8
5

Plate 10

THE UNIVERSITY OF ALBERTA

The outlines of this piece of rock appear as two opposed or overlapping half spheres, the one side showing the outlines of the female face and the other the outlines of the male. The lines of the human skull fit exactly over those of this rock, and the neck part is the end of the magnetic pole of the earth.

All the different kinds of atomic groupings, that could take place at this period of the history of the earth feeding upon the chemical substances formed by crystalline groupings of the decomposed water-cell, formed one positive indivisible chain, and its rotating condition as magnetic motion caused the accumulation of these cells as one magnetic centre. As no magnetic field can make up a perfect balance except it contains six conditions of increase, including all the different directions in which matter could move, the final form of that which governed this movement must have reached its condition as a crystalline condition before it could become a thing of individual "parts."

The pushing together of these cells which crystallized as one mass was the result of a continual grouping of cells, because of the continual formation of matter by the grouping of the primal system of 3-4 with its mass of ether, throughout the different conditions governing the occupation of space, or the time required for a field of magnetic gaseous electricity to perform its different stages of increase in speed of rotation, to a centre and from that centre, the same activity that characterizes the accumulation of chemical substances making up the life history of the animal cell. It is not carbon or nitrogen or any other chemical that produces the vital process, but it is the vital process that brings together groups of atoms, as 2, 4, 8, 16, 32, 64, and 128, as a final system, consisting of a brain and a body, a system that can expend the energy generated by the body as a force of push.

Is it prophetic that this present century has seen man at his best in inventing a machine that will enable him to "push" his way through the atmosphere? Is it actually his body now becoming brain substance, in demanding to be carried to the skies?

The brain itself must perforce mount still higher, and we hope that in the near future he shall be able to say: "Thus far and no farther shalt thou come, thou paralysis in crystallization."

THE END.

Appendix

Just before going to press, a request has been received for the insertion of certain phenomena attending colloidal solution, as an effect produced by surface tension upon the formation of the gel skeleton.

The first condition of matter, as a mass of gaseous electricity, divided into definite quantities in groups of electric units, these units forming charges of different kinds but containing the same number of units, the difference in the charges arising in the position they occupy in space, will afford an explanation of the conditions governing the phenomena attending colloidal solutions. For instance, if there are 1,700 negative electrons held as one mass (positive atom) in the most compact form possible in matter, there may also be 1,700 electric units held in one mass and yet each unit, being held as far apart as possible from another, will occupy a larger space than that occupied by the compact form. This is where the difference in size arises in primordial or primal groups of electric units. It represents the difference in expansion in gases under difference in temperature. There will be the same quantity of ether as the seat of magnetism required to hold the small mass in a compact form as will be required to hold the larger mass in its condition of tension or repulsion between particles as units. The breaking down of this tension forces a rearrangement of electric charges. The compact mass, as a force towards a centralization of matter, represents the female force, and the larger occupation of space, as individualized parts or units held in definite positions in space, determines the male force. The union of the two is a union of forced motions and it is impossible that motion should continue except under these conditions.

Zigsmondy says, "The conviction has gradually gained more and more ground that colloidal solutions are in reality fine subdivisions of an originally solid substance," etc.

This original solid substance was the condition of matter as a spherically stratified mass of gaseous electricity, held as a compact mass, by an equal mass of gaseous electricity as individual units held in a state of tension or repulsion between units.

The decomposition of this "inner core" and "outer shell" brought forth the individualization of motions by reason of the individual units as the male force forcing a change in the orbital path of units or electrons making up the compact mass. Their motions had been towards a centre, and the male being from a centre to a circumference, as a repulsion between units, caused a change in the direction of motion, and the change forced in the orbital path of electrons produce radiation, or *Light*, and the meaning of *Sex* is the production of *Light*.

At this stage of rearrangement of motions were forever fixed

THE UNIVERSITY OF ALBERTA

the direction in which electric charges should travel, because space is filled, and units can only move as a result of a process of decomposition. This force of decomposition is that of the male element and is that which is known as "surface energy." This energy forces particles to move in definite direction, and this is proven by Quincke, who says, "Under the influence of surface tension, thin-flowing, oil-like lamellæ form spheres, bubbles, spherical foam-walls, and under some conditions spiral surfaces. Solid thin lamellæ curl up together into a hollow cylinder or hollow sphere. Lamellæ of very sticky oily fluid lie between them, acting like thin solid lamellæ, and curling up into a hollow cylinder, or hollow sphere, which then gradually subdivides into spherical bubbles like a fluid tube, or else forms swellings and constrictions."

This description of the formation of the gel skeleton shows the same phenomenon as is continually taking place in bacterial growths. The "swellings and constrictions are descriptive of the "Involution Forms" of bacterial growths.

The hollow spheres are such because two oppositely-moving fields of particles are engaged in building up the spheres, and the interior of every spherical cell must begin as a "hollow sphere," because inside of the sphere is contained the gases as "internal oxidation process."

The spiral surface, as described by Quincke, shows the force that caused one-fourth of the whole mass of matter comprising the Solar System to break up into individual parts, as the "stars," and we find the same process of spiral formation by bacteria, breaking down into Rods and finally into spheres. (Plate 1, fig. 5).

The bacteriologists do not agree as to the hollow condition of the spherical bacteria cell, a majority believing it to be hollow. Some are hollow and others must contain the gaseous internal values broken up into parts, which are sometimes found to resemble granules when stained. The staining matter forces the contents into centres as granules, through the force of plasmolysis.

This division of the mass into parts explains the association of different minerals in definite parts of the earth. Their accumulation makes up a magnetic "field of gaseous electricity" forced into a compact mass. Bismuth is a very good substance to illustrate this accumulation force in nature. Native bismuth crystallizes in the cubic system, but is also found massive, granular, reticulated (network), and arborescent. These five conditions prove its origin under the decomposition of the six primal stages through the five different combinations between magnetism and electricity. Bismuth is found associated with different elements such as iron, silver, lead, zinc, cobalt, copper, arsenic, etc. It is almost as common as iron in association with centres of mineral deposits.

There are also six different compounds of bismuth, showing its origin as "parts" in the six stages of primal accumulation. Its association with sulphur and iron is very suggestive of its origin.

As a mineral arising as a centre in a great indivisible mass of gaseous electricity surrounding the mass of the earth, its different combinations will result from its different positions as centres in this mass, and we find in the fourth stage of increase a key to its origin of growth. The fourth stage commences with (24·32) the weight of iron, as 56. This association explains the presence of iron. The grouping of the atoms as equal to hydrogen atoms moving in opposite directions, under decomposition, makes this growth a paired growth throughout its whole association with other elements. This being so, we must look for its origin as pairs in the numbers 6, 12, 24, which yield 21 pairs, or 21 pairs as a seed which must find a balance in growth by building up an inner core and outer shell of equal values through the five accumulations in the six stages of rearrangement of atoms under decomposition. This would give five times 42, or 210, the weight of the atom of bismuth.

The static group of 4 attending these three numbers, 6, 12(and 24, are 8, 16, and 32, and these numbers make up 56, the weight of iron. The individualization of the numbers as "groups" would afford the association of carbon as 12, and oxygen as 16. The presence of silica as 28 would arise through the grouping of (6-8) as an inner core and outer shell.

Its origin in the fourth stage of increase and at this centre of grouping is further proven by the manner of its deposition of atoms, forming masses as granular, reticulated, aborescent and massive. Its crystallization in the cubic system proves its origin in opposite pairs, which would bring its triune accumulation as a group of 8, or a cube.

Its growths as granular, reticulated, and arborescent, shows the "fixation of the different stages of motions observed in protoplasmic activity. Its arrangement as a network proves its growth as an equal division between the two lines of force as positive parallel lines cut across in two magnetic lines of force, which are always at right angles to those of the electric.

The manner of growth of electro-magnetic particles will prove to the student of colloidal solutions that the phenomena attending the protoplasmic conditions of matter will show him that colloidal solutions contain a network at one time, a honeycomb of threads at another time, and thin walls, made up of spherical forms, at another time. They must be according to the direction in which primal groups are forced to move, and this direction is being changed continually according to the gaseous electricity that is being released as broken down charges of electricity, or groups of primal "quantities" of ether moving in opposite directions, etc.